

525 3

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**U.S. Army  
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# **Phase 2 Remedial Investigation Report Army Materials Technology Laboratory**

## **Task Order 1 Remedial Investigation/Feasibility Study**

Contract Number DAAA15-90-D-0009

### **Volume 3 - Figures**

May 1994

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*Prepared for:*

U.S. Army Environmental Center  
Aberdeen Proving Ground  
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94P-2492

*Prepared by:*



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West Chester,  
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Task Order 1

**PHASE 2 REMEDIAL INVESTIGATION FOR BASE CLOSURE  
REMEDIAL INVESTIGATION/FEASIBILITY STUDY  
ARMY MATERIALS TECHNOLOGY LABORATORY  
WATERTOWN, MASSACHUSETTS**

Contract No. DAAA15-90-D-0009

VOLUME 3

May 1994

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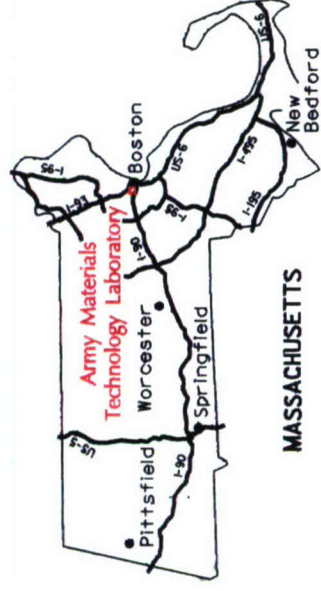
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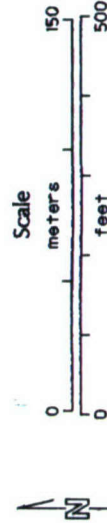


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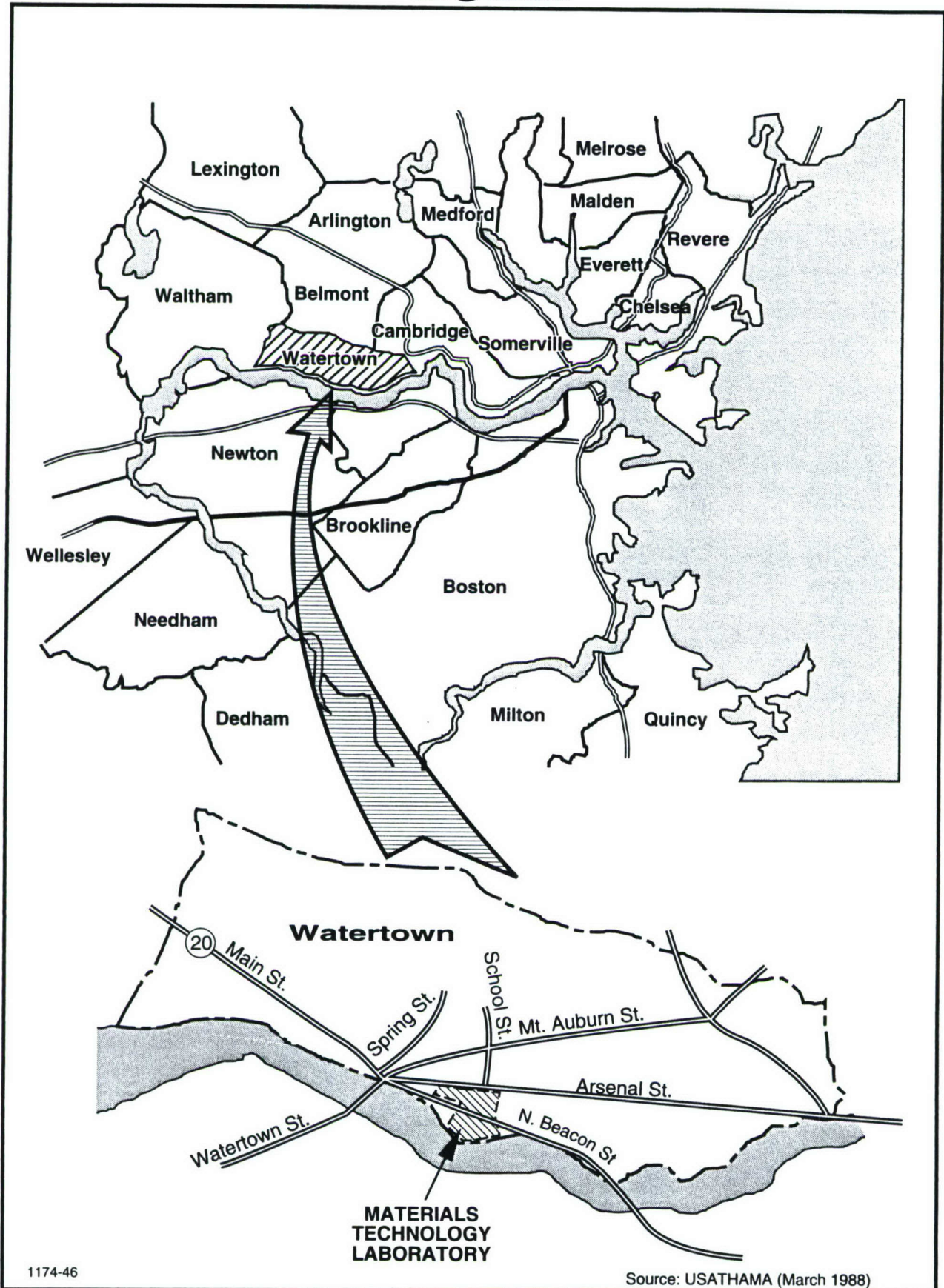
- Surface Soil Sampling Location
- Soil Boring Location
- Soil Boring/Monitor Well Location
- Soil Sampling Grid
- Pre-Existing Monitor Well
- Phase 2 Monitor Well
- Phase 2 Deep Monitor Well
- Sediment and Surface Water Sampling Location
- Shallow and Deep Sediment Sampling Location (and Surface Water Sampling Location in some cases)
- Building where Chemical Wipe Samples were collected

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Figure ES-1  
Phase 2  
Sampling Locations

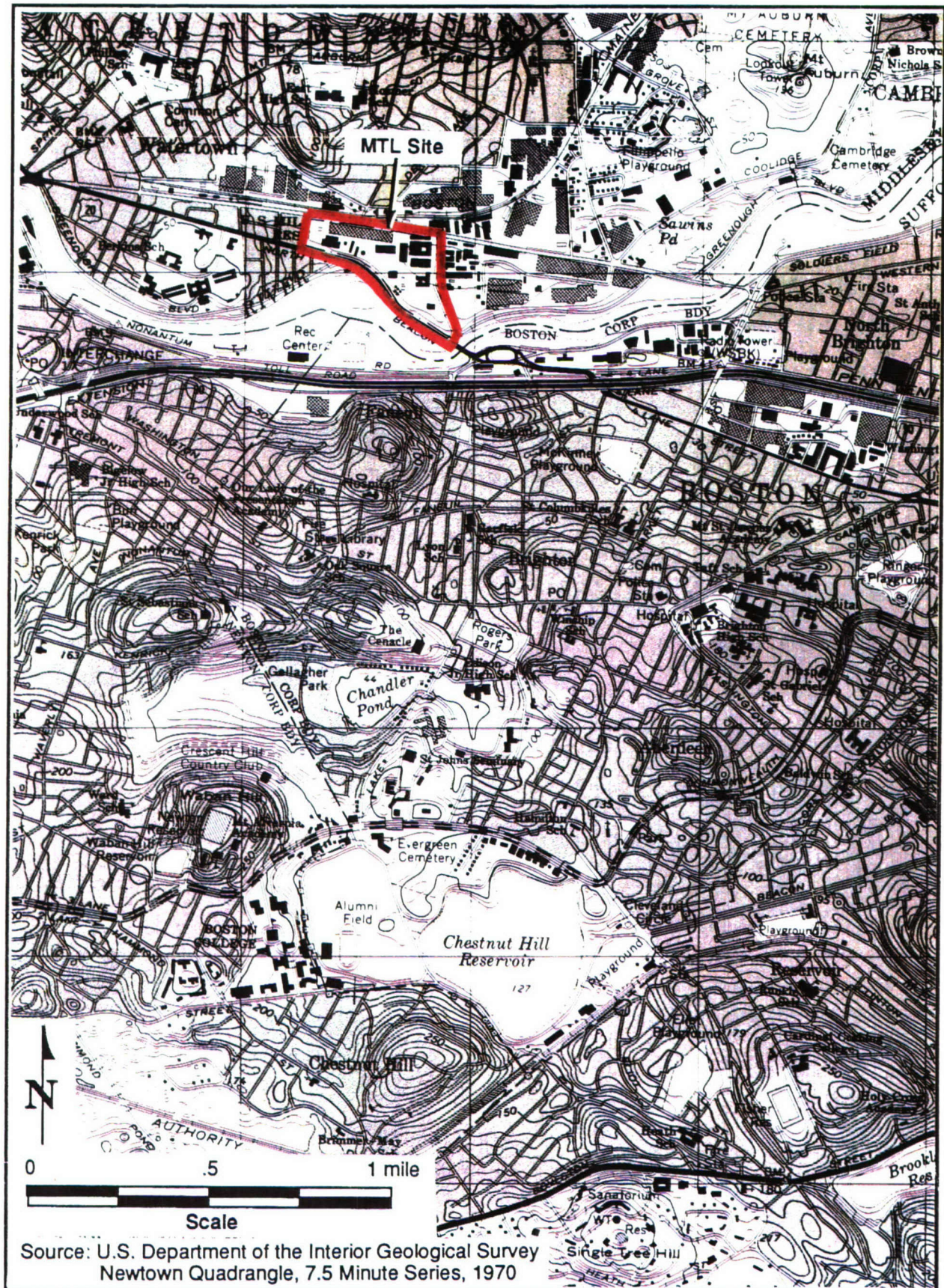






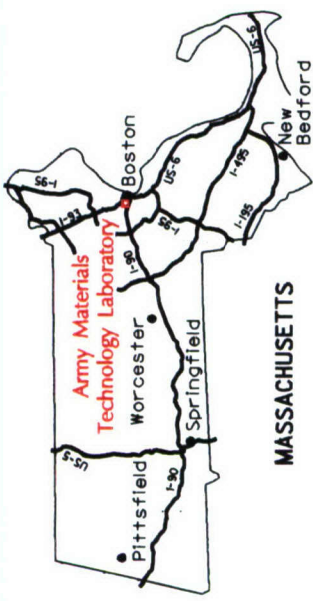
**FIGURE 1-1 LOCATION OF MTL**



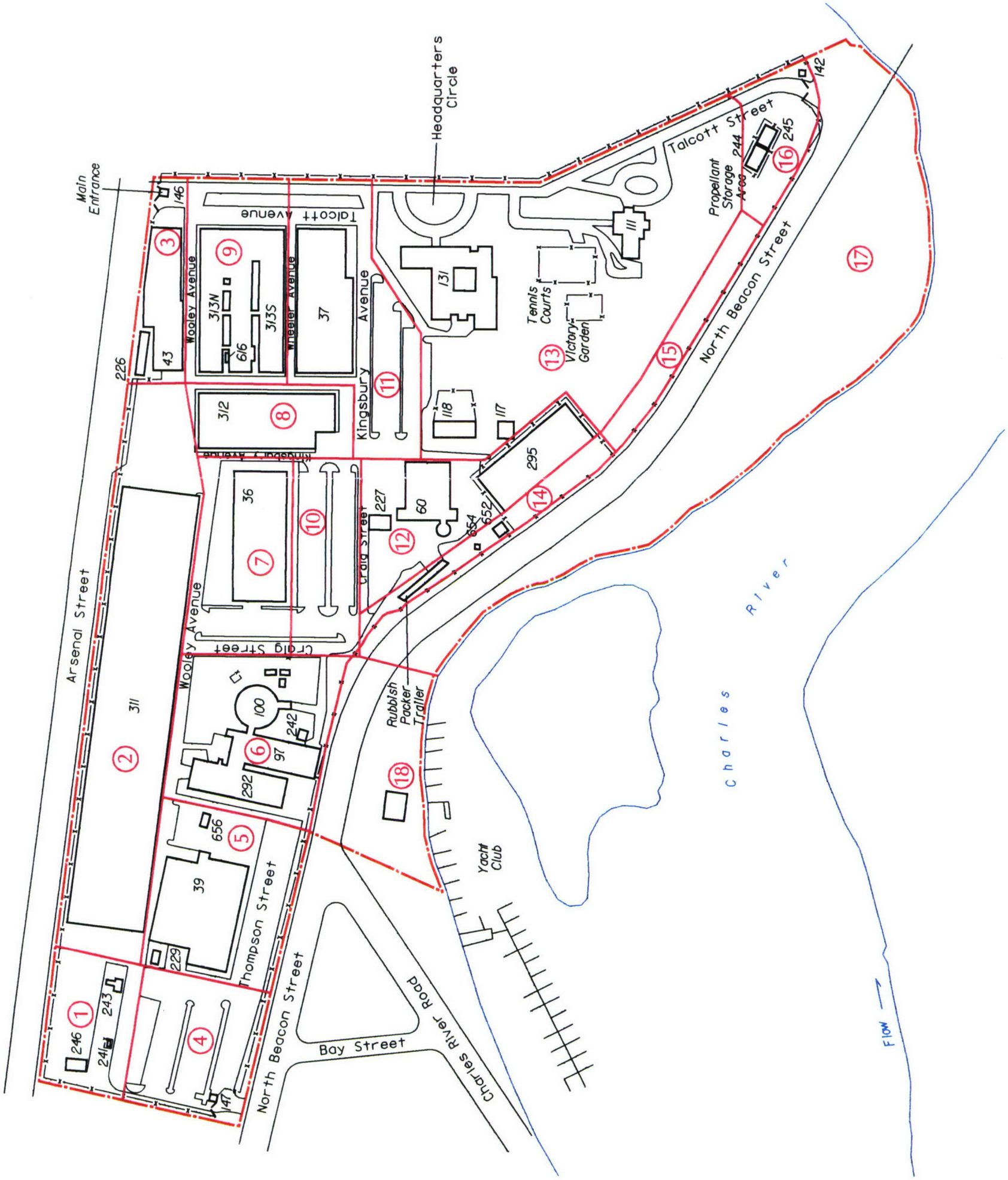


**FIGURE 1-2 TOPOGRAPHIC MAP FOR MTL AND SURROUNDING AREA**





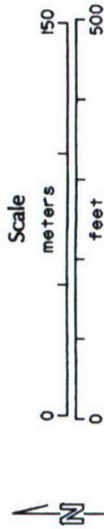
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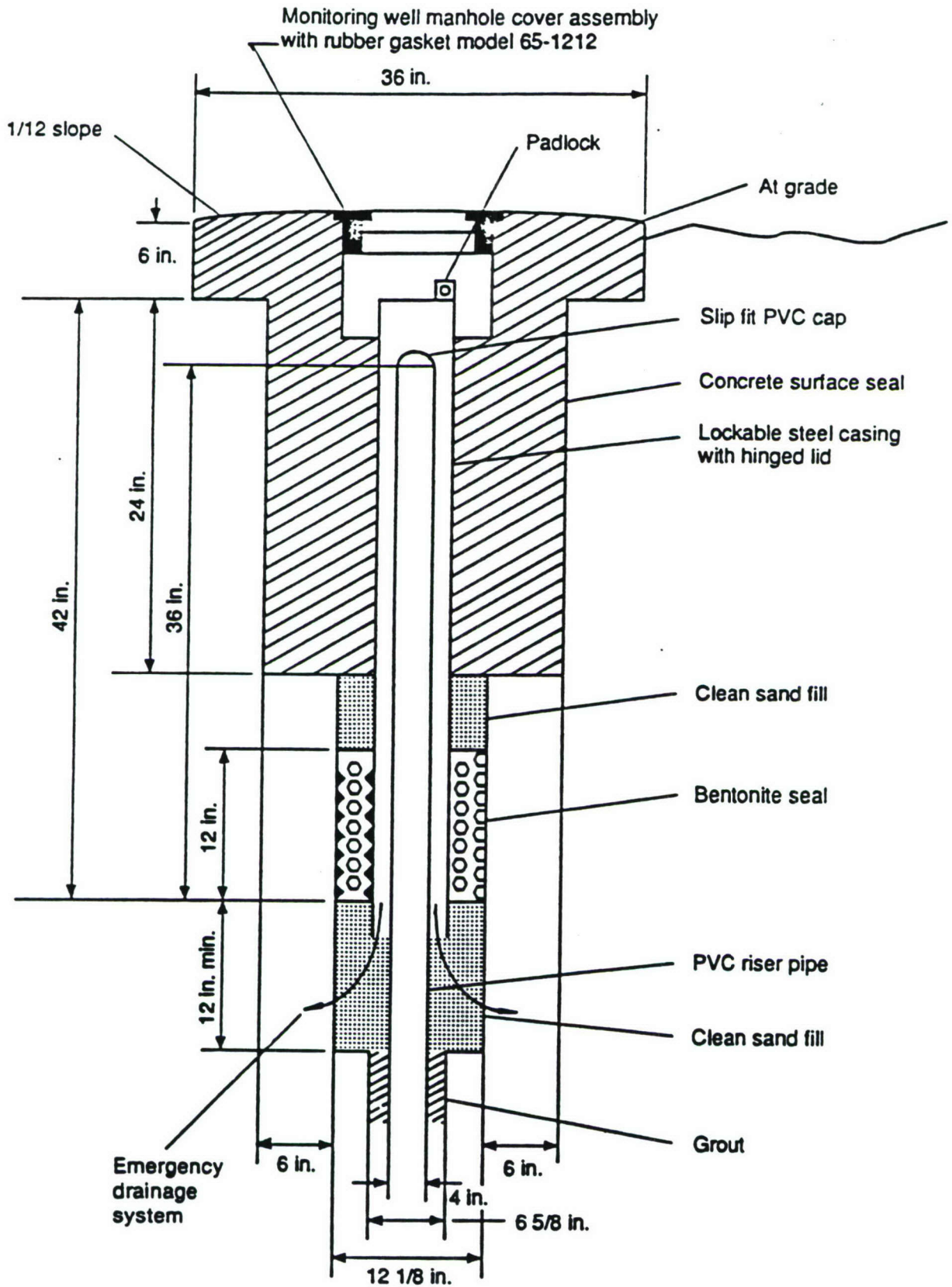
Figure 1-3  
Geographical  
Subdivisions of MTL

- (13) Sampling Unit Numbers  
(Source: E.G.&G., 1988)
- Sampling Unit Boundary  
(Source: E.G.&G., 1988)



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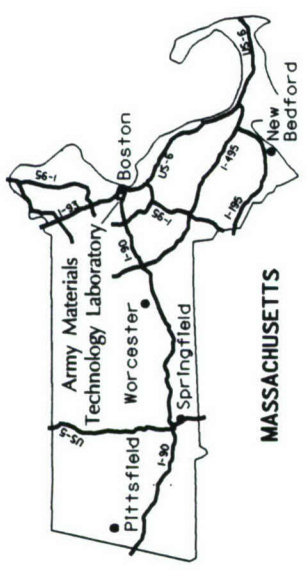
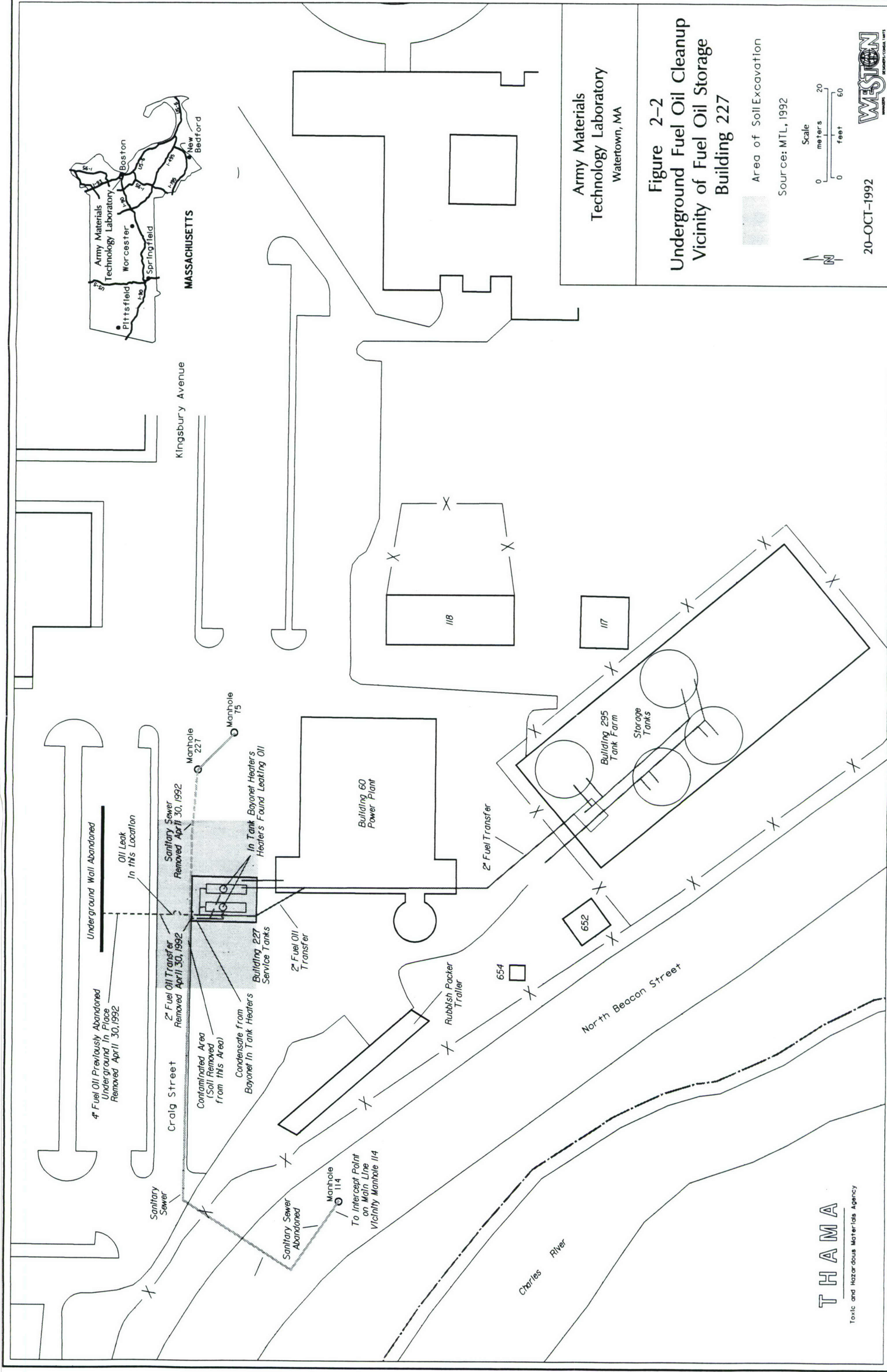




Source: EG&G, 1990

**FIGURE 2-1 WELL COMPLETION (MANHOLE TYPE)**





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**Figure 2-2**

**Underground Fuel Oil Cleanup**

**Vicinity of Fuel Oil Storage Building 227**

Area of Soil Excavation

Source: MTL, 1992

Scale

0 20 60

meters feet

20-OCT-1992

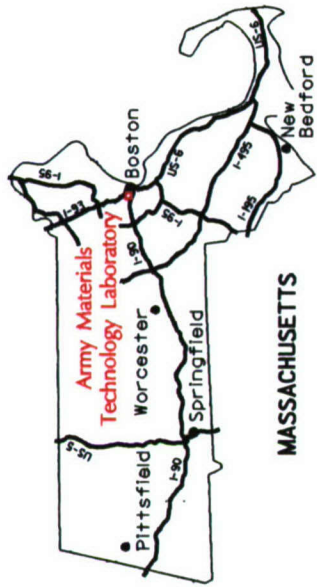
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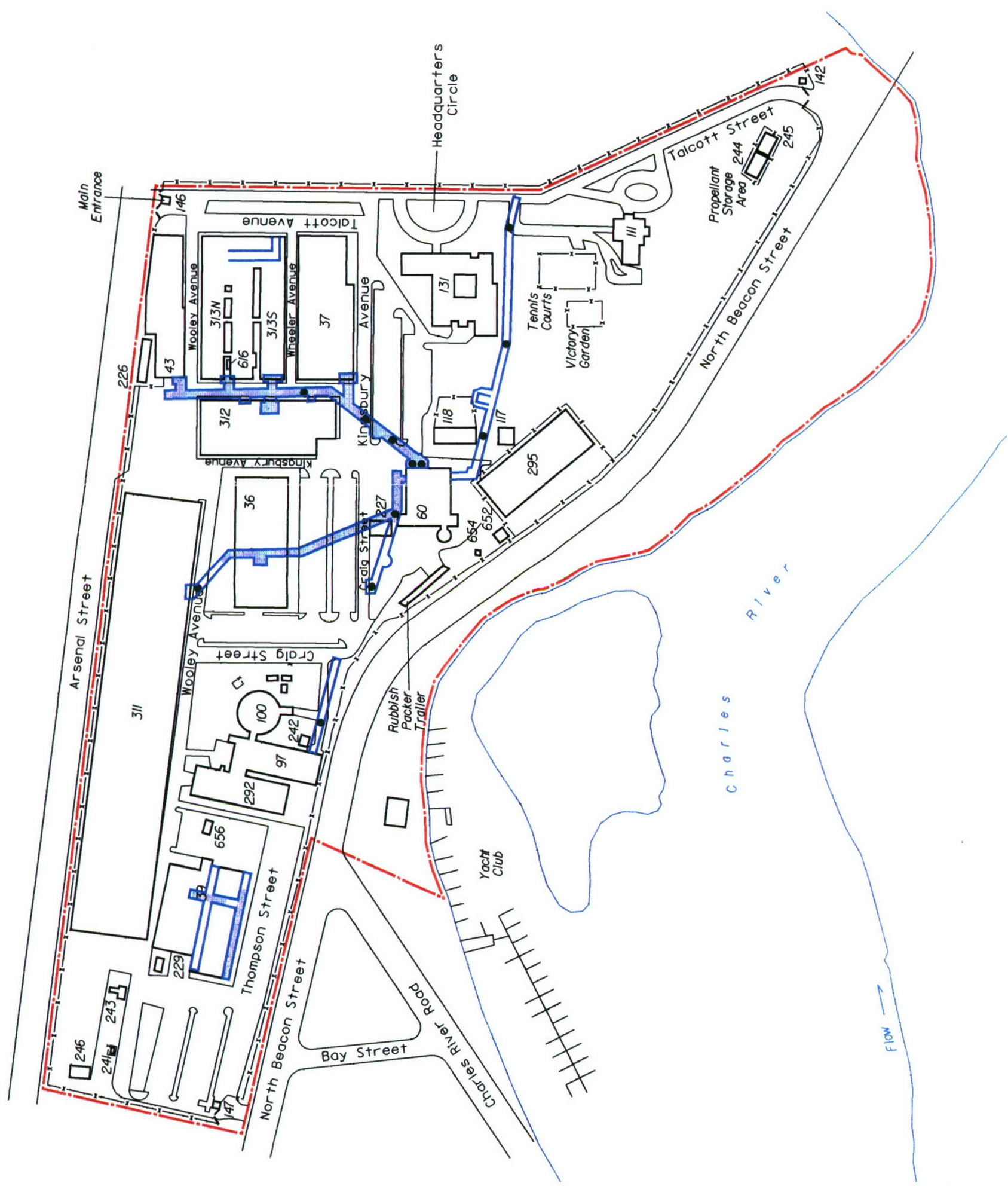
 Tunnel and Manhole  
 Tunnel Portion Visually Inspected by Weston Personnel

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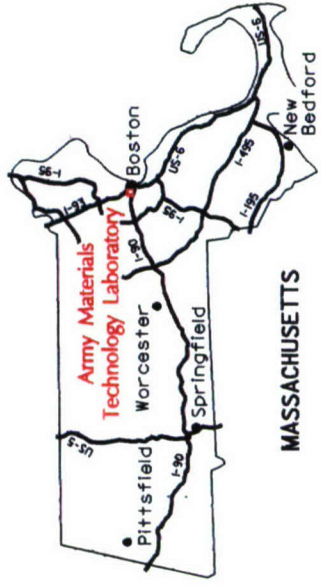
Figure 2-3  
 MTL Tunnel  
 System



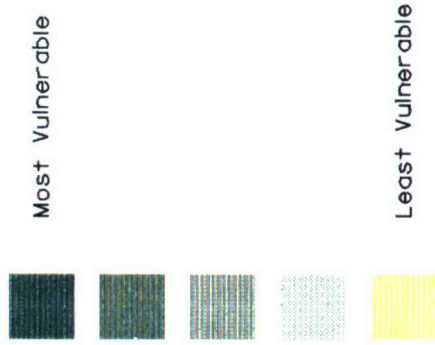
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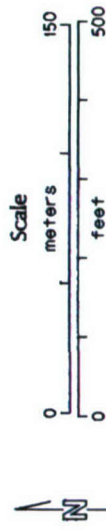


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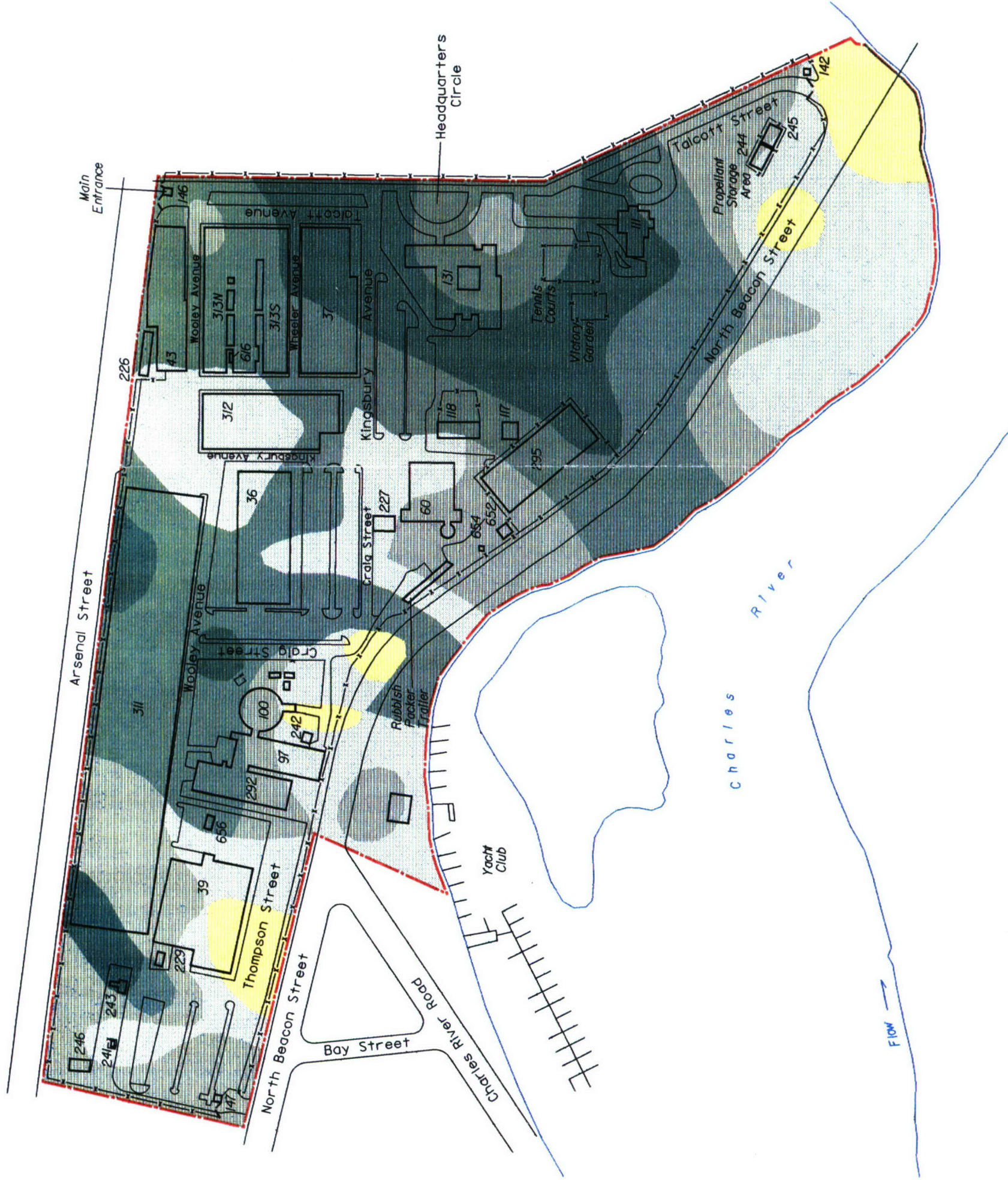
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Figure 2-4  
Archaeological  
Vulnerability at MTL



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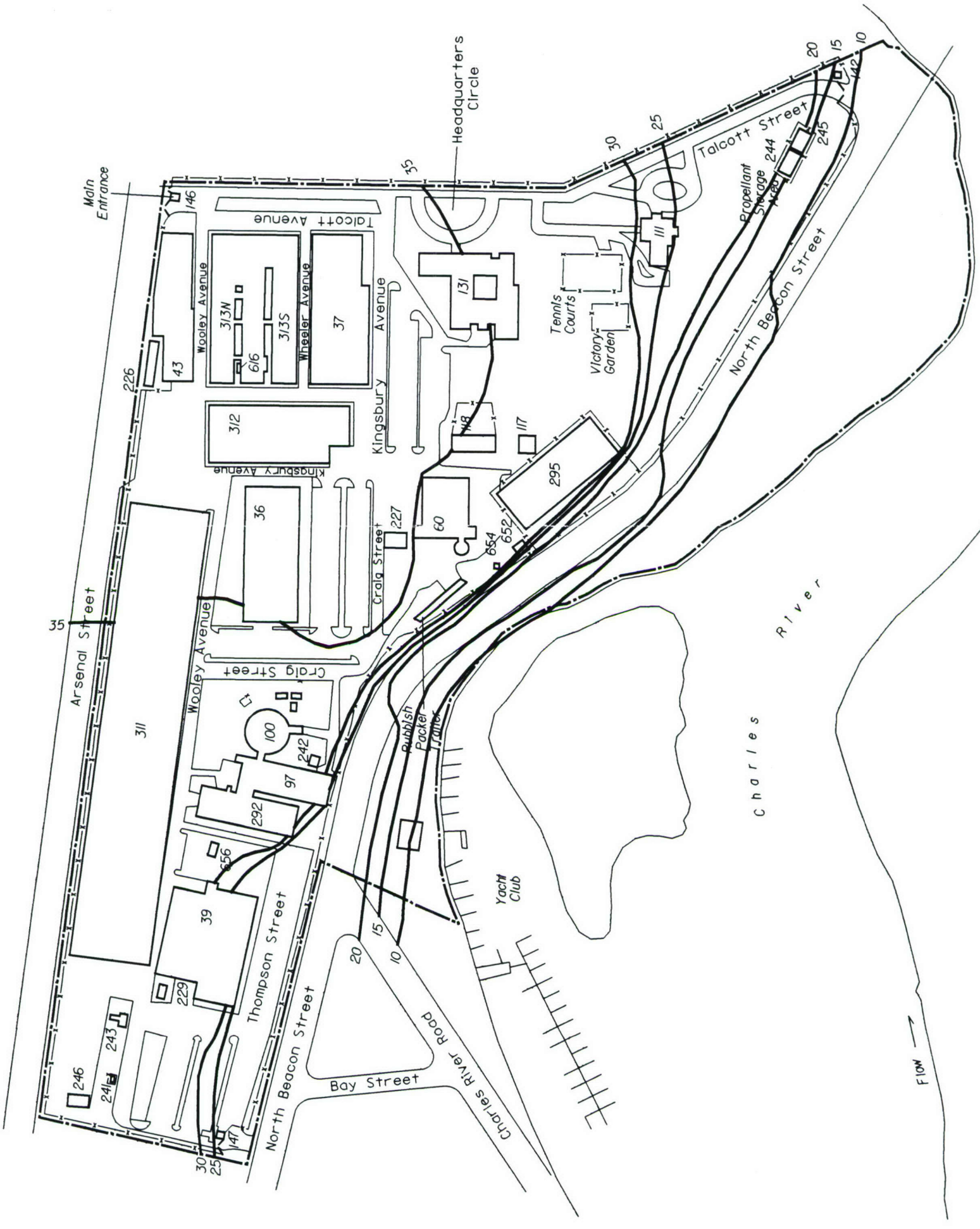
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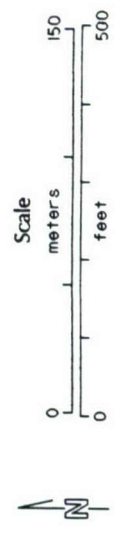


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Figure 3-1  
Topographic Profile

— Elevation in Feet  
(Above Mean Sea Level)

Source: E.G.&G., June 1990





BOSTON LOGAN INTERNATIONAL AIRPORT  
1985 THROUGH 1989  
CALMS INCLUDED

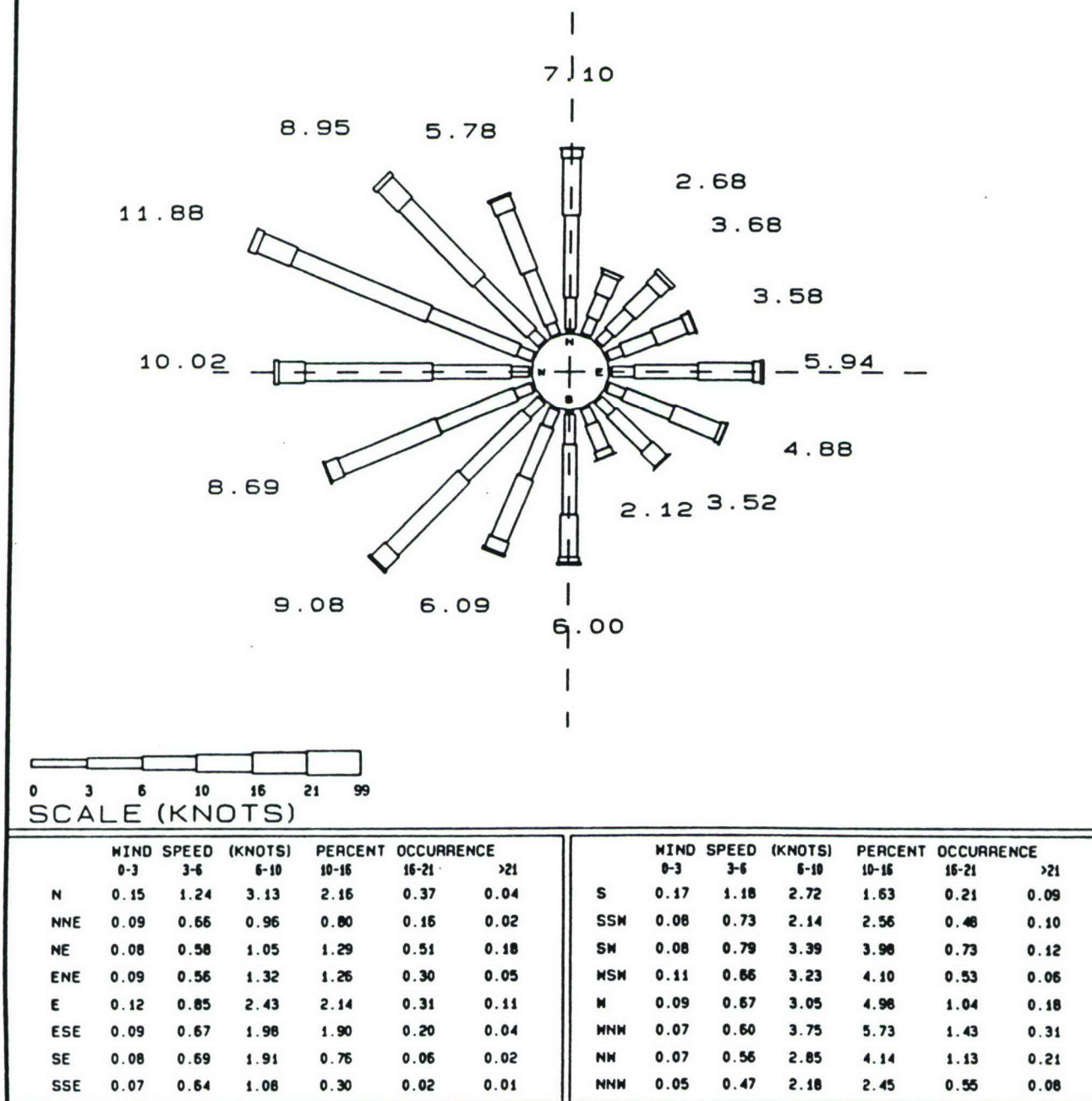
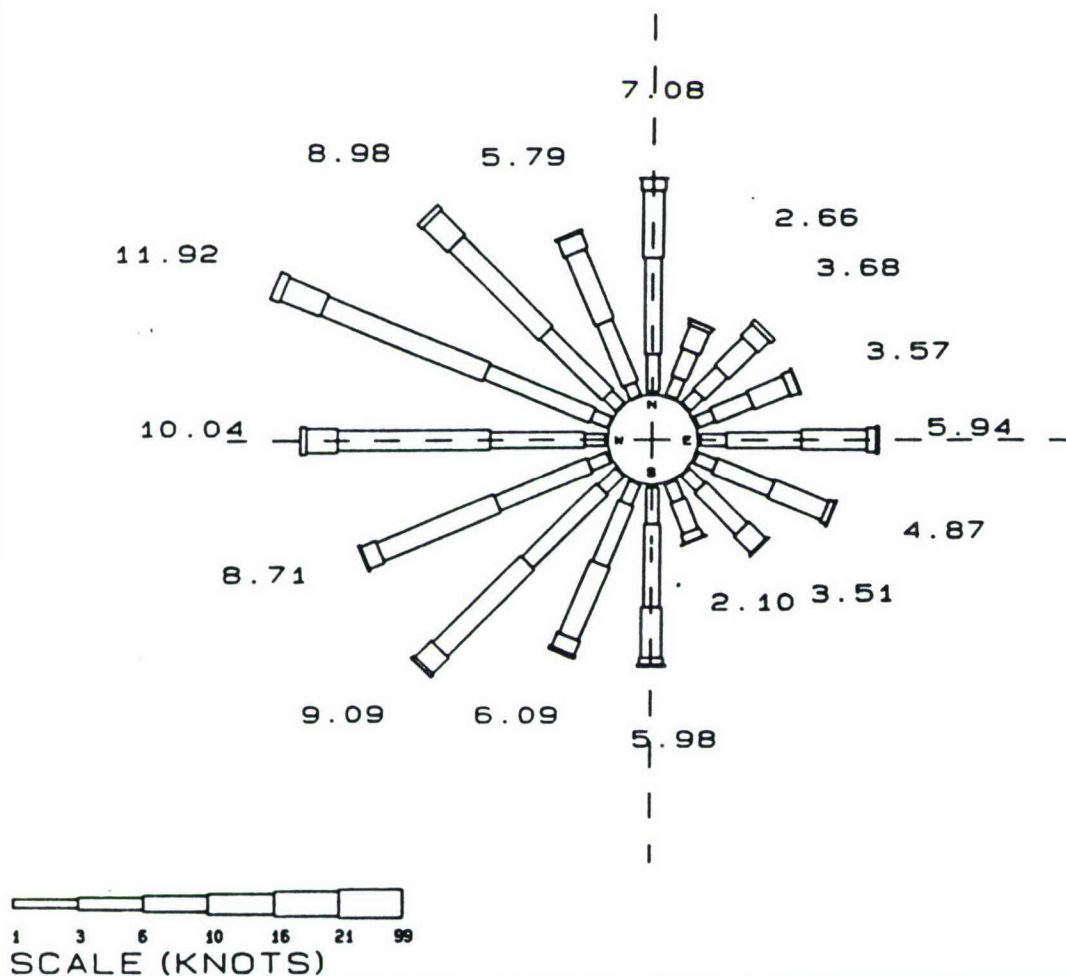


FIGURE 3-2 WIND ROSE (CALMS INCLUDED) FOR MTL  
F-10

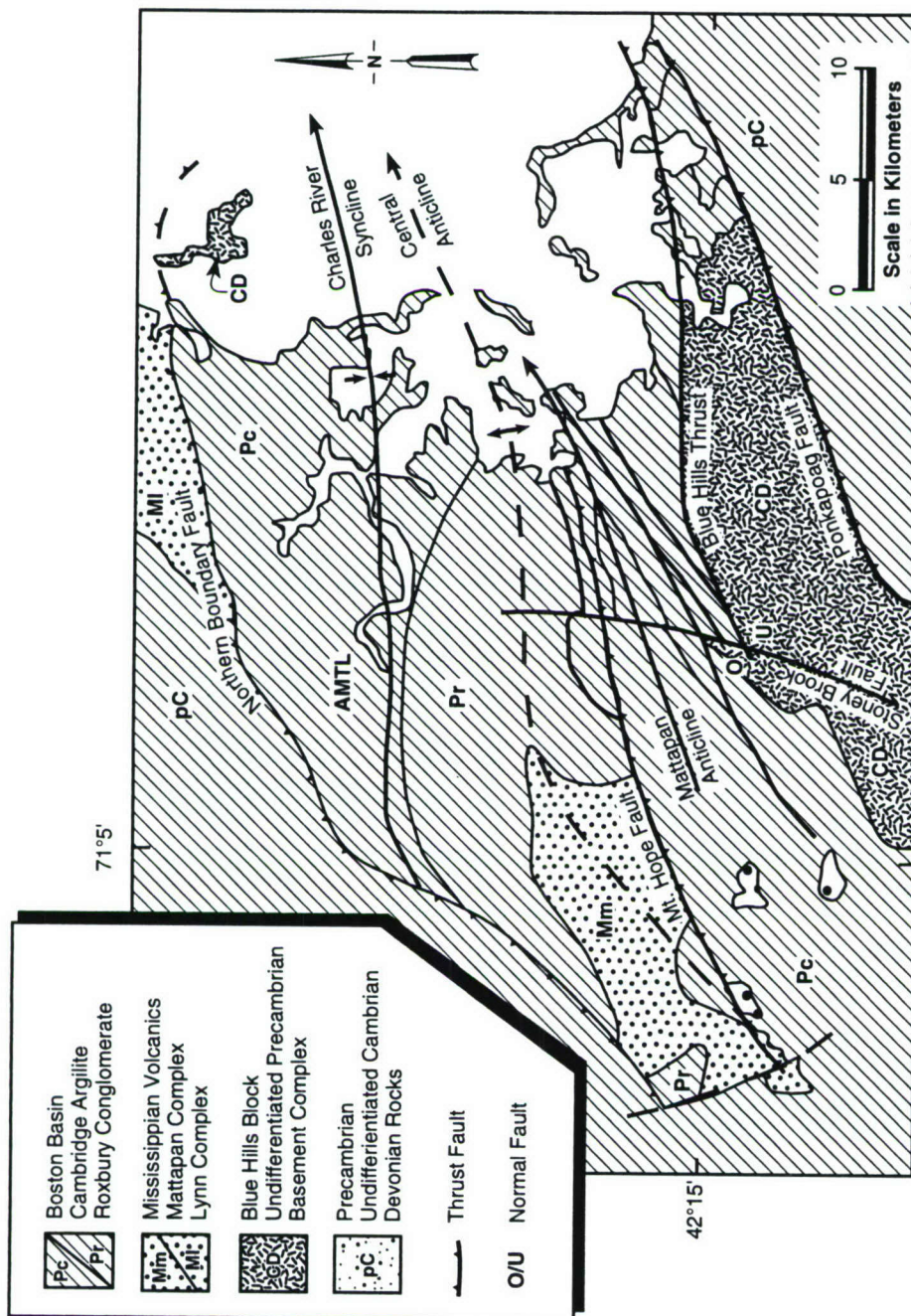
BOSTON LOGAN INTERNATIONAL AIRPORT  
1985 THROUGH 1989  
CALMS EXCLUDED



	WIND SPEED (KNOTS)						PERCENT OCCURRENCE						
	1-3	3-6	6-10	10-16	16-21	>21	1-3	3-6	6-10	10-16	16-21	>21	
N	0.09	1.25	3.15	2.17	0.37	0.04	S	0.11	1.18	2.74	1.64	0.21	0.09
NNE	0.05	0.66	0.96	0.80	0.17	0.02	SSW	0.04	0.74	2.15	2.57	0.49	0.10
NE	0.05	0.58	1.05	1.30	0.52	0.18	SW	0.04	0.79	3.41	4.00	0.73	0.12
ENE	0.06	0.57	1.33	1.26	0.30	0.05	WSW	0.07	0.66	3.25	4.13	0.54	0.06
E	0.08	0.85	2.44	2.15	0.31	0.11	W	0.05	0.68	3.07	5.01	1.04	0.18
ESE	0.05	0.67	1.99	1.91	0.20	0.04	NNW	0.04	0.60	3.77	5.77	1.43	0.31
SE	0.04	0.70	1.92	0.77	0.06	0.02	NW	0.04	0.56	2.87	4.17	1.13	0.21
SSE	0.03	0.65	1.08	0.30	0.02	0.01	NNN	0.03	0.48	2.19	2.46	0.56	0.08

FIGURE 3-3 WIND ROSE (CALMS EXCLUDED) FOR MTL



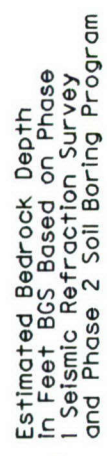


SOURCE: EG&G June 1990

**FIGURE 3-4 GENERAL BEDROCK GEOLOGY MAP OF THE BOSTON BASIN (BILLINGS, 1976)**

936-7853b





**Figure 3-5**  
**Approximate Depth**  
**to Bedrock Surface**

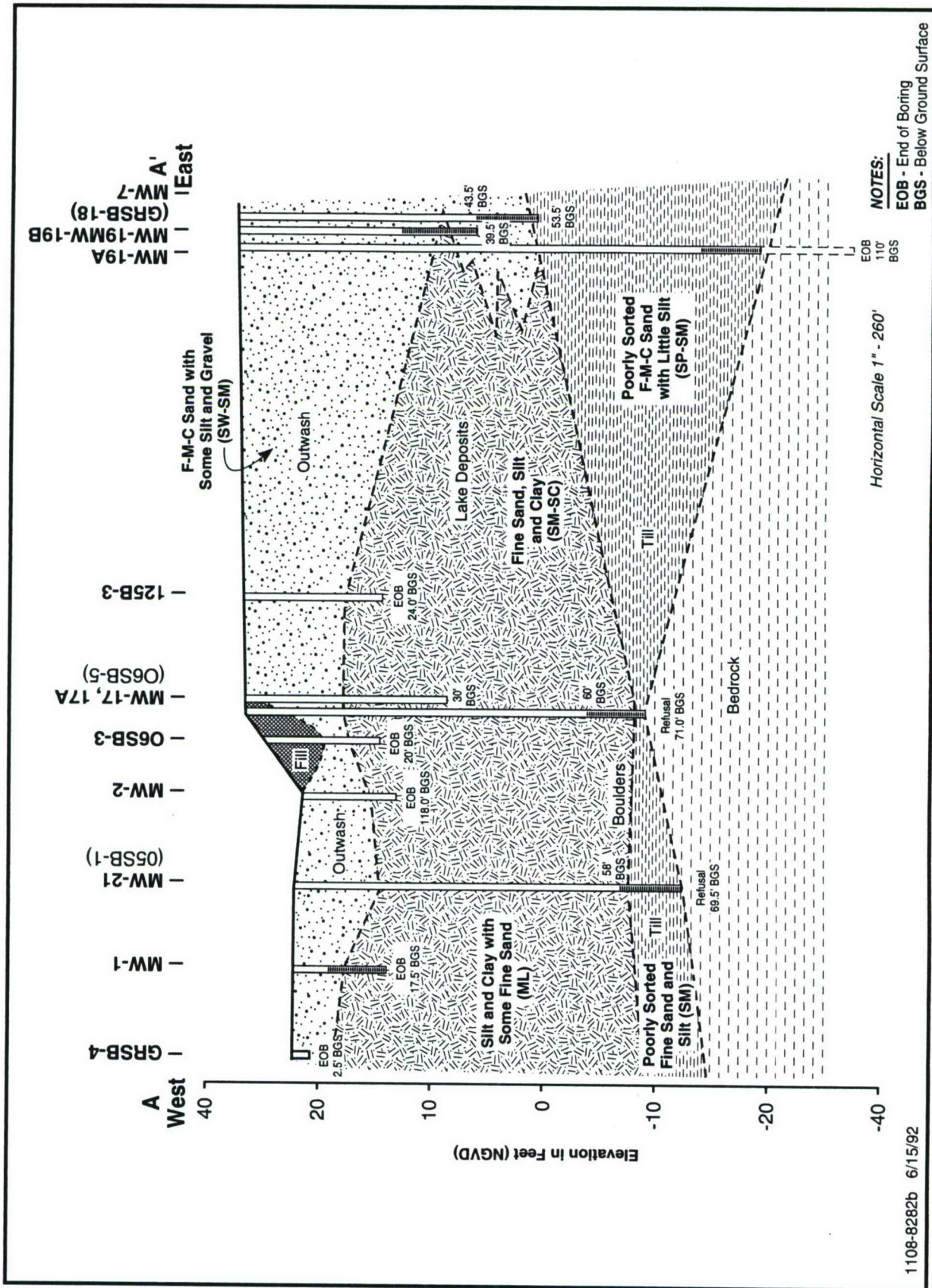
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F-13

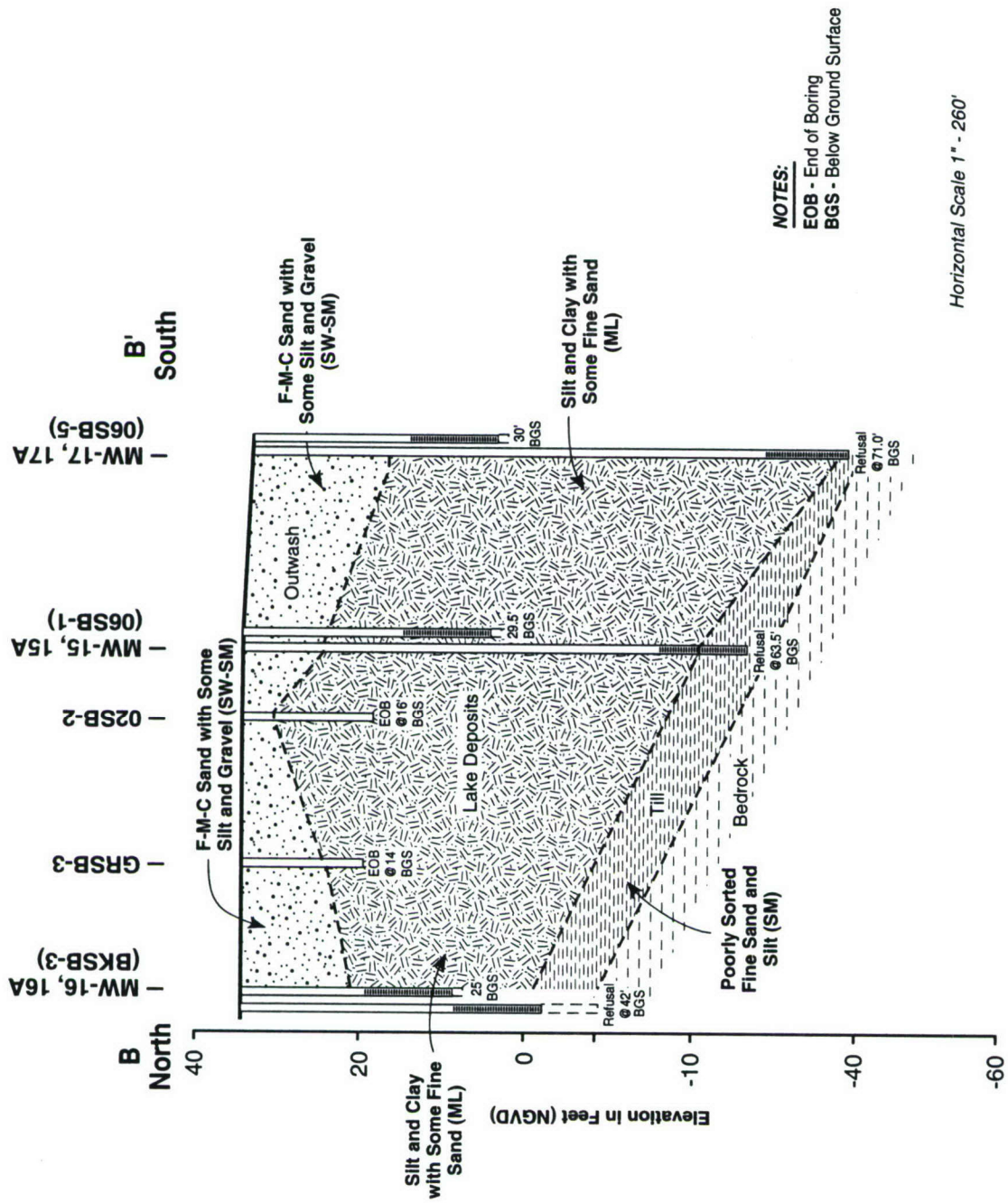








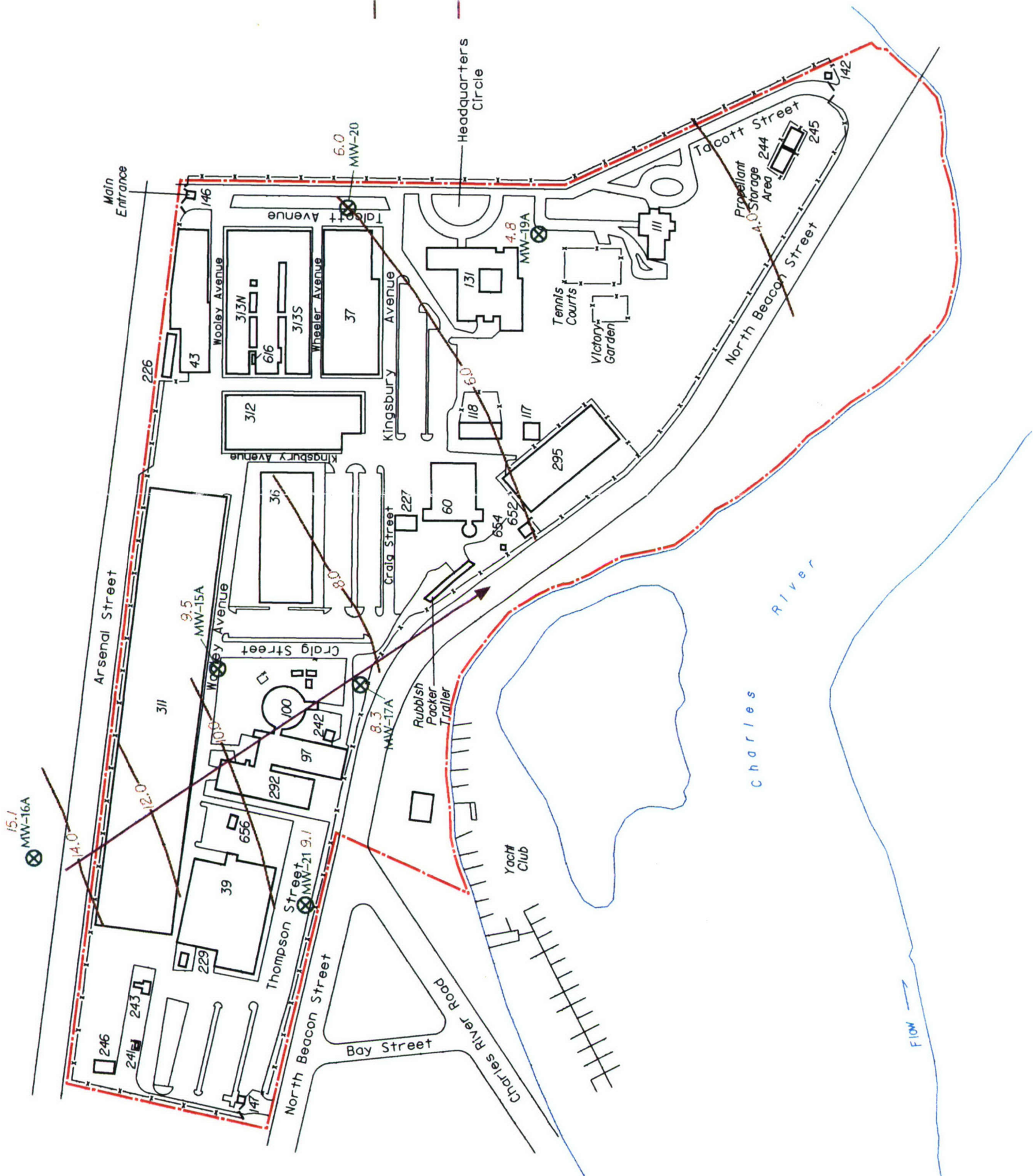
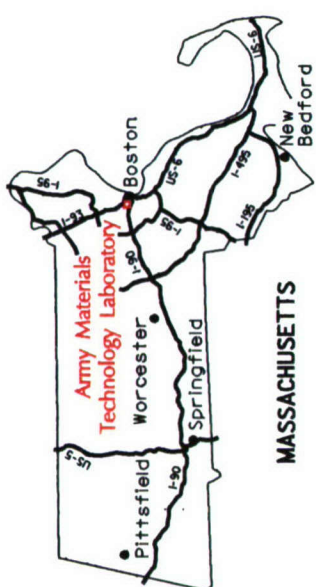
**FIGURE 3-7 GEOLOGICAL CROSS SECTION A-A'**



1108-8282a 6/15/92

**FIGURE 3-8 GEOLOGICAL CROSS SECTION B-B'**





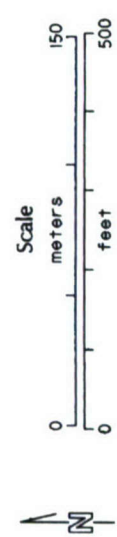
Phase 2 Deep Monitor Well

Groundwater elevation in feet, based on 09-Dec-1991 water level measurements. All elevations referenced to National Geodetic Vertical Datum of 1929.

Flow Path

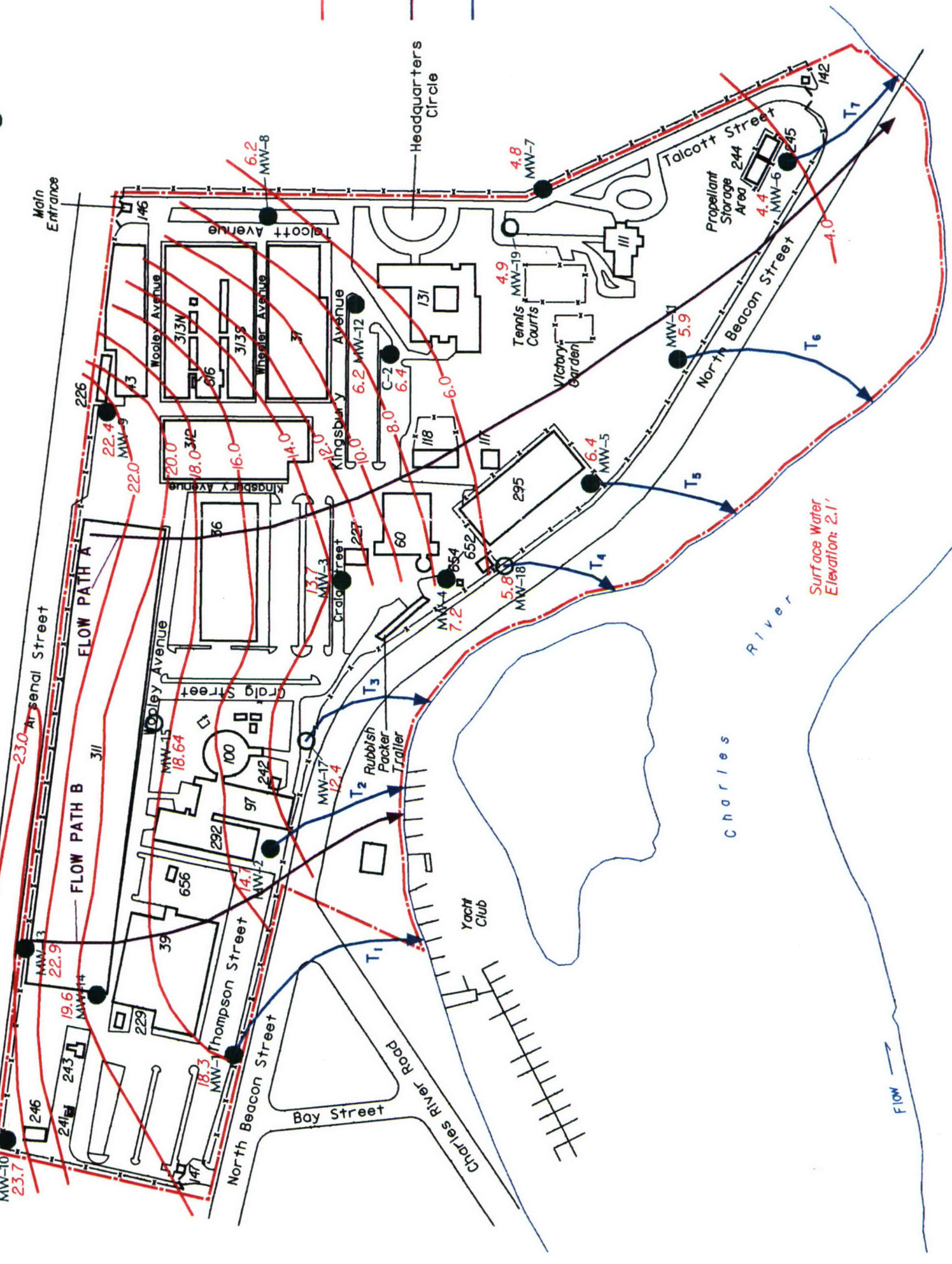
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Figure 3-9  
Groundwater Contours  
Deep Wells





22.72 MW-24  
23.7 MW-10  
21.23 MW-16  
23.2 MW-23  
16.7 MW-22

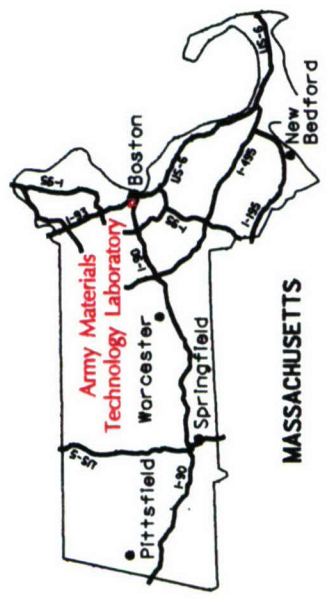


● Phase 1 Monitor Well  
○ Phase 2 Water Table Monitor Well

Groundwater elevation in feet, based on 09-Dec-1991 water level measurements. All elevations referenced to National Geodetic Vertical Datum of 1929.

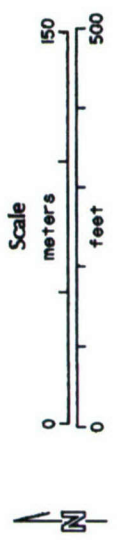
Flow Path A and Flow Path B used to calculate the hydraulic gradient across the site.

Flow Paths T<sub>1</sub> through T<sub>7</sub> used to calculate estimates of travel times between down gradient property line wells and the Charles River.

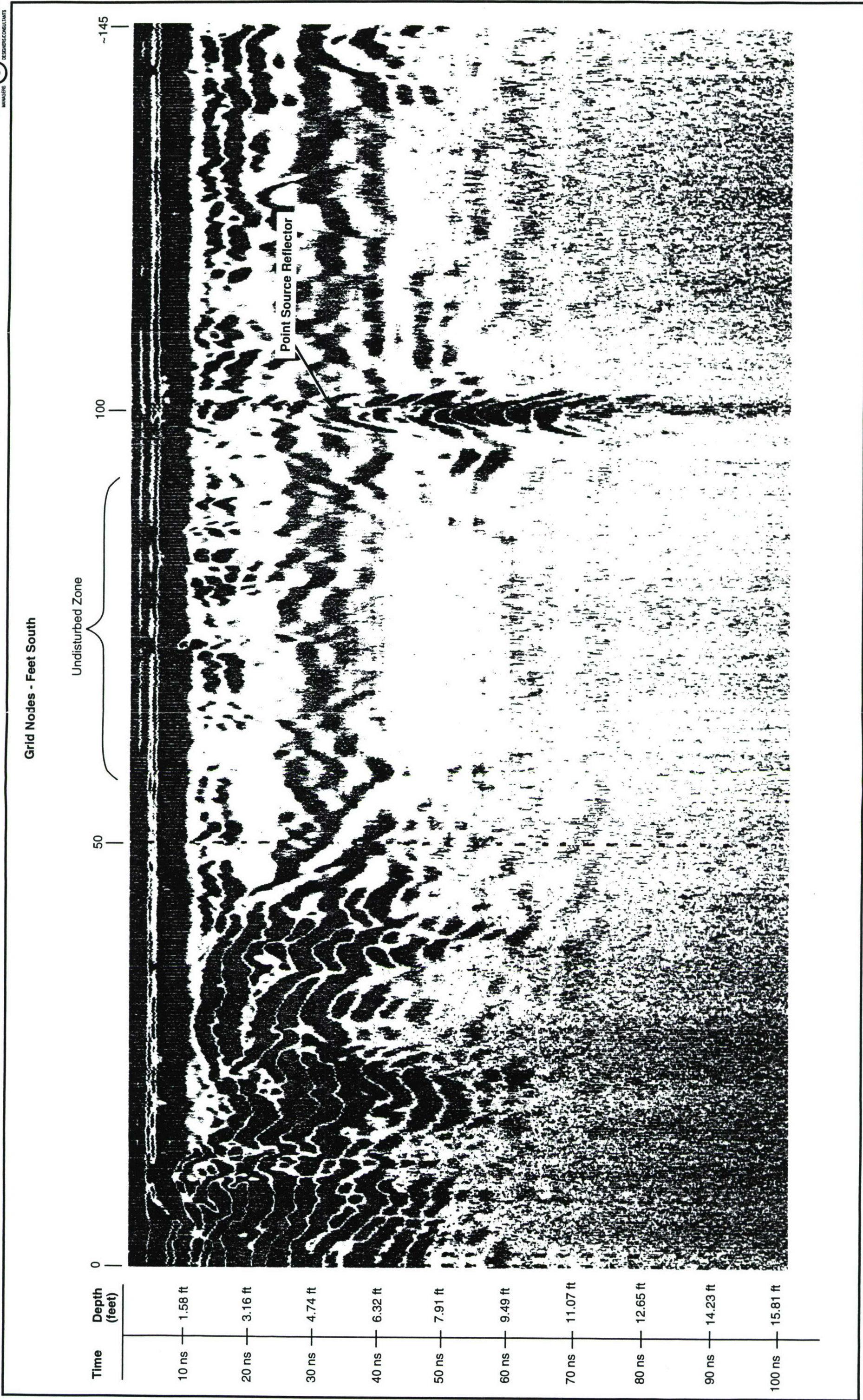


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Figure 3-10  
Groundwater Contours  
Water Table Wells

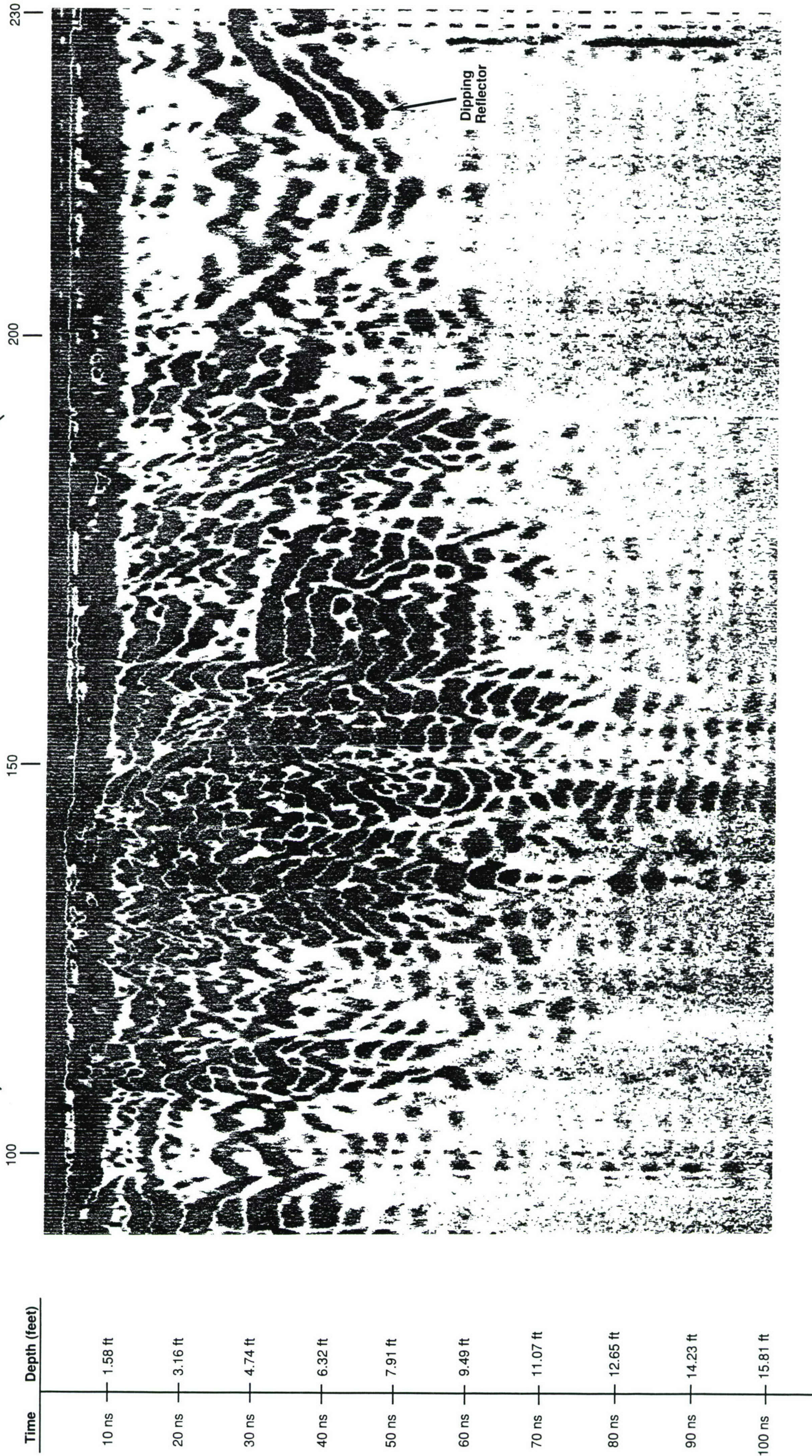








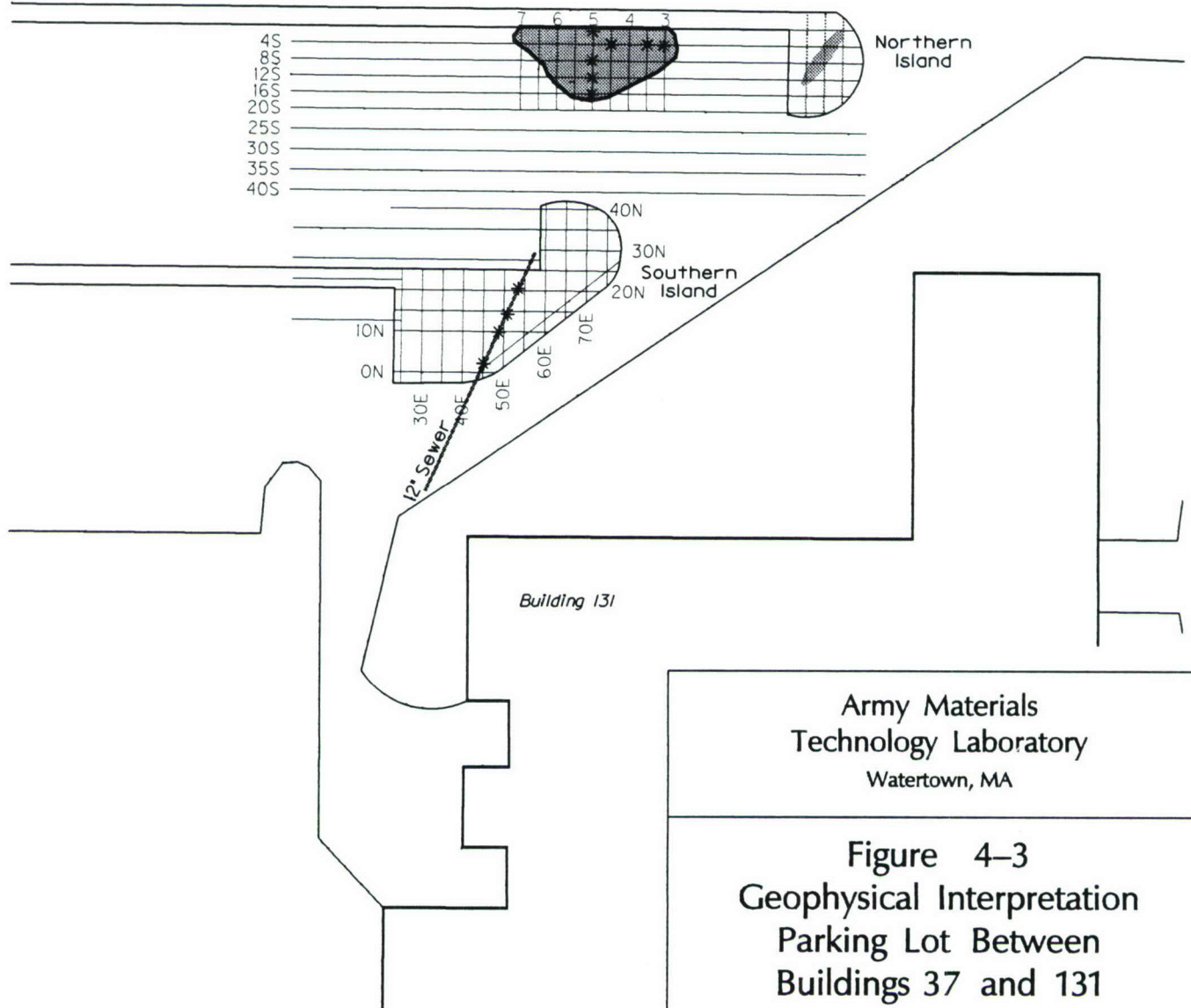
Grid Nodes - Feet South  
Area with Multiple Point Source Reflectors





Building 37

Kingsbury Avenue

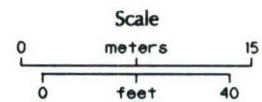


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Figure 4-3  
Geophysical Interpretation  
Parking Lot Between  
Buildings 37 and 131

- \* Discrete Buried Object
- High Conductivity Readings
- Disturbed or Fill Area
- GPR Traverse
- Buried Utilities

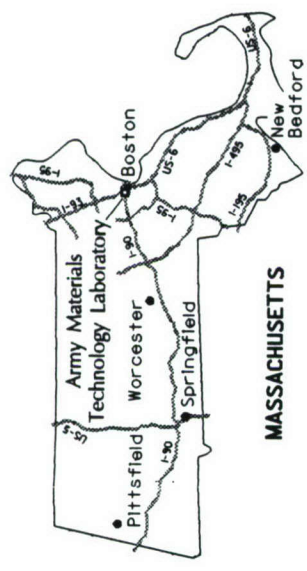
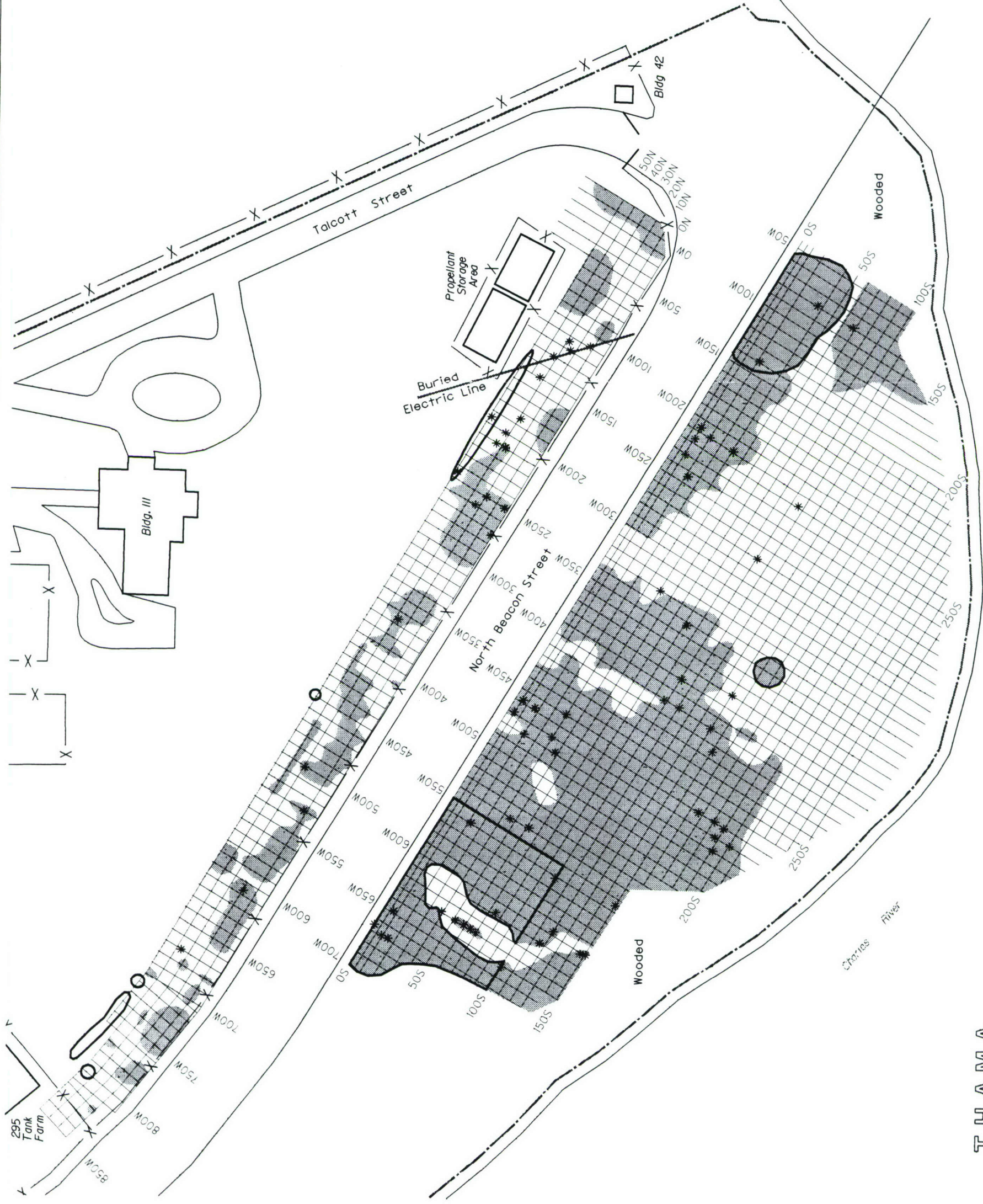
F-21



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Figure 4-4  
Geophysical Interpretation  
Along North Beacon Street

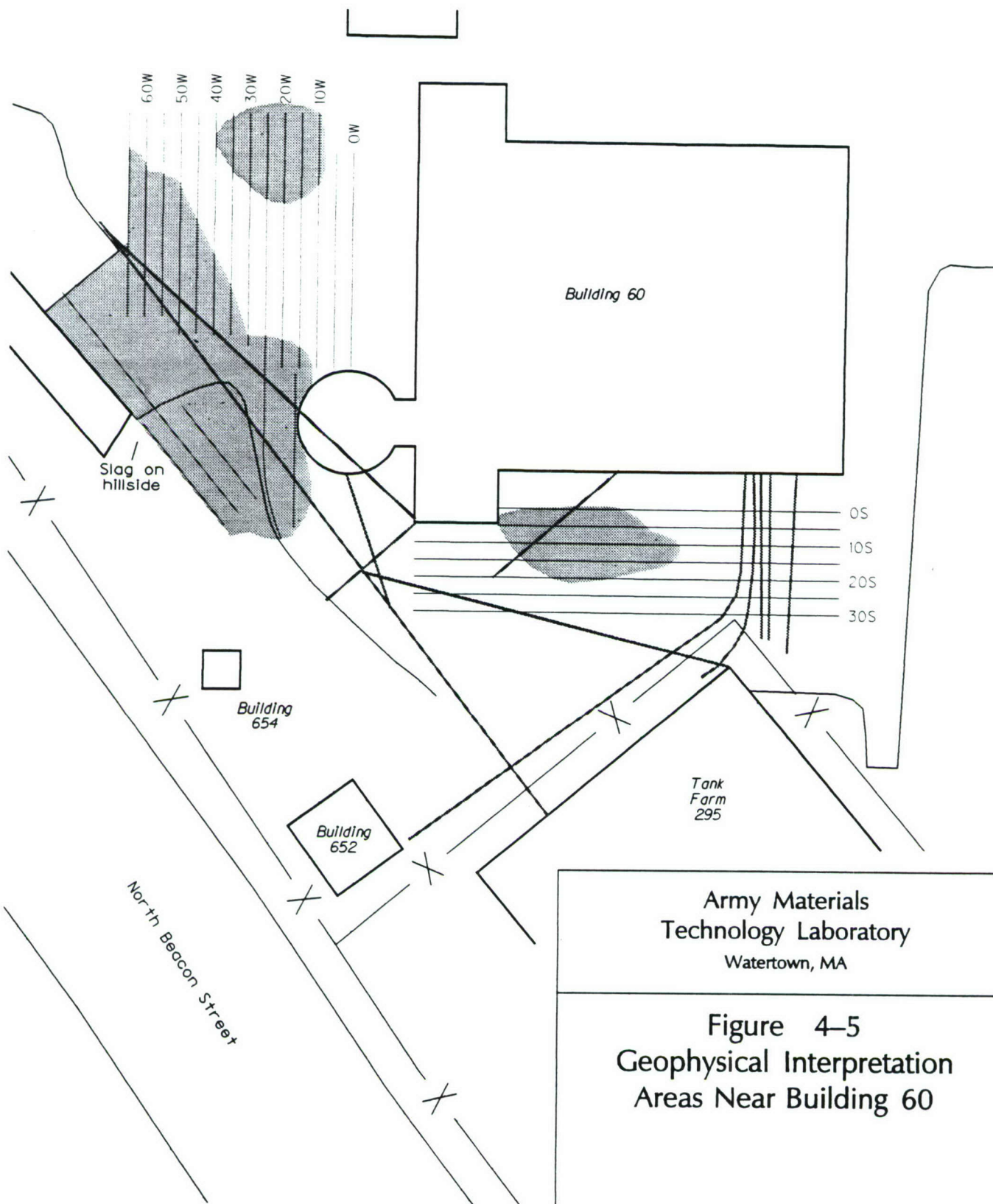


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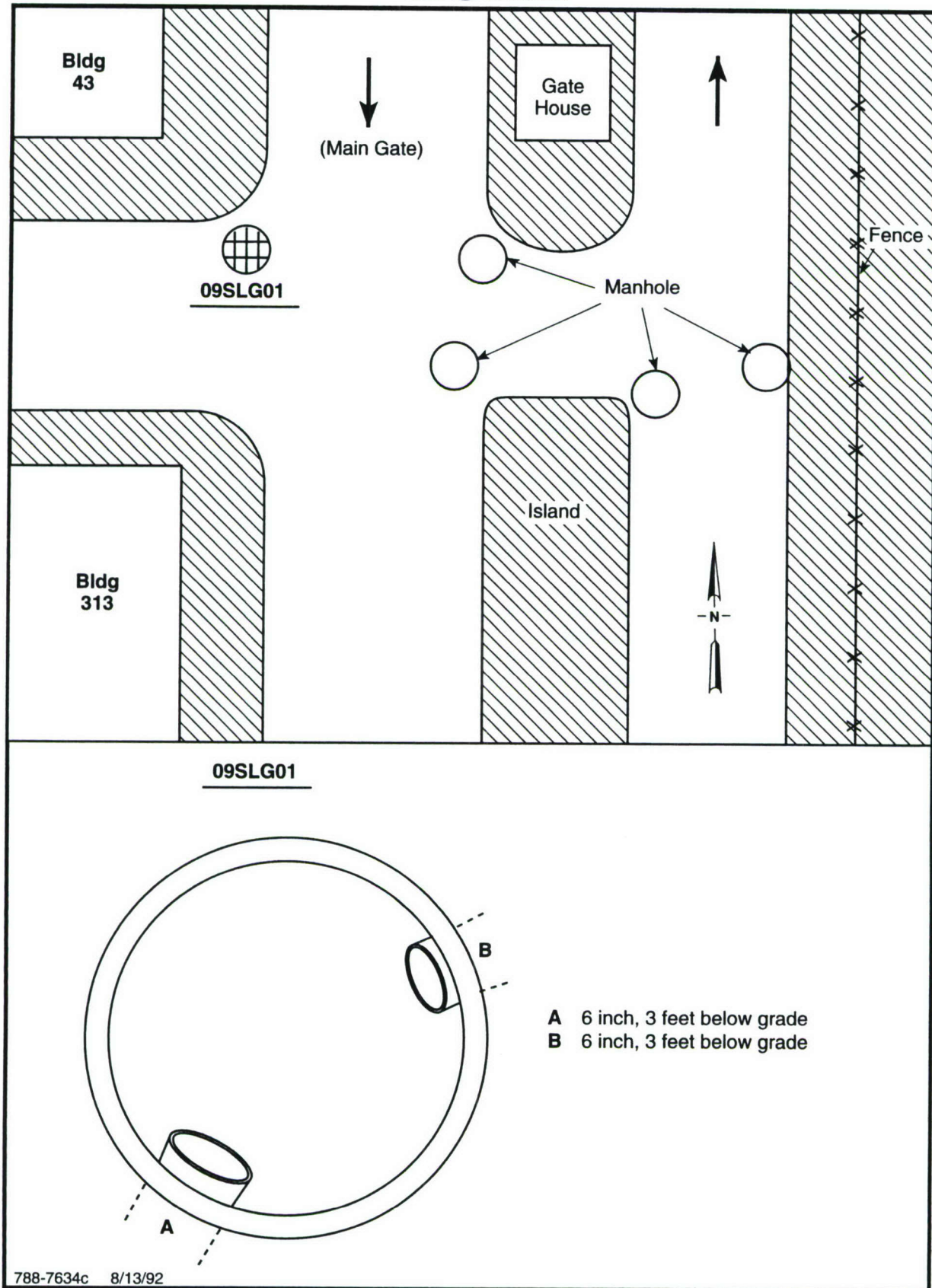




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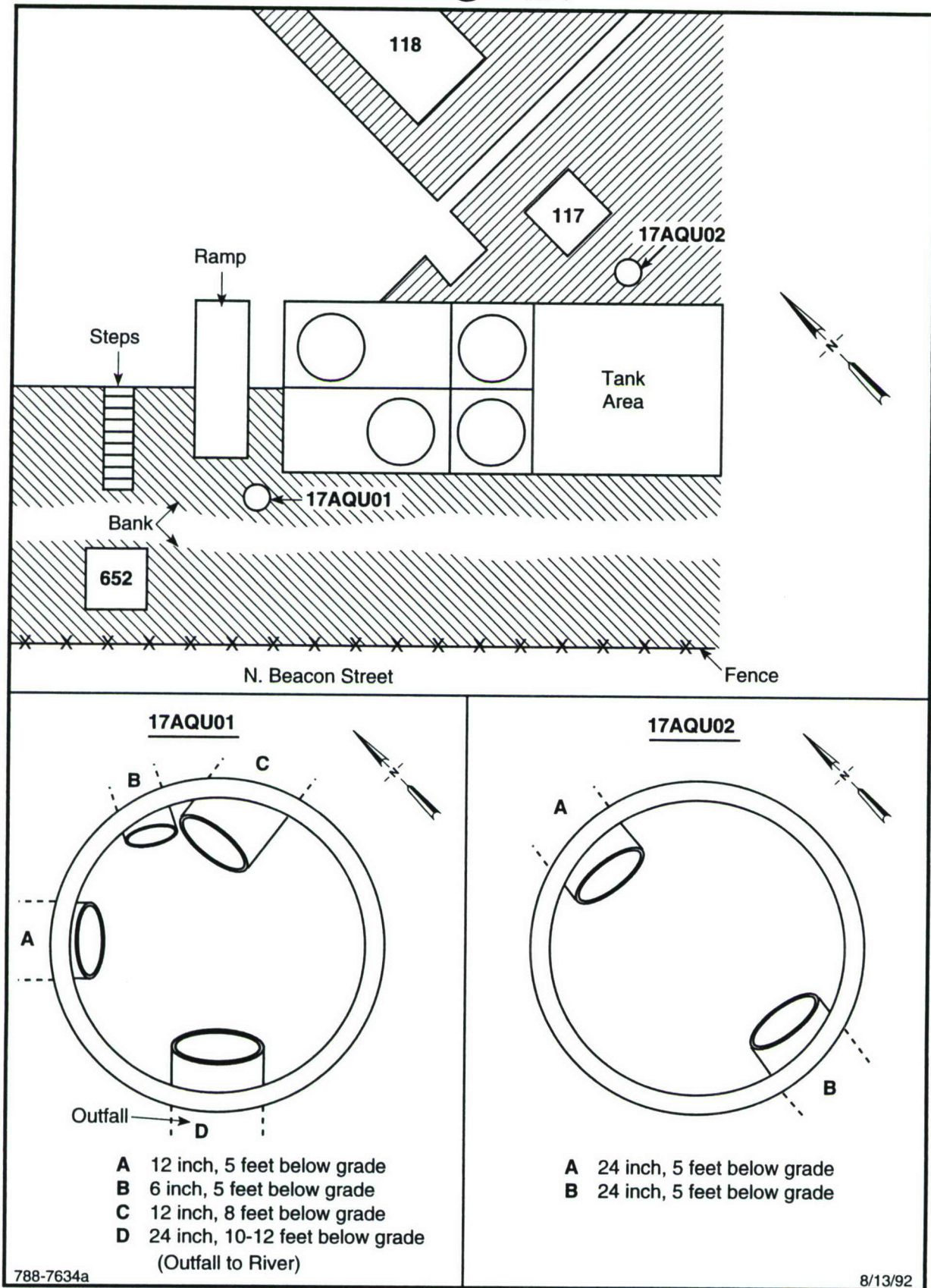
Figure 4-5  
Geophysical Interpretation  
Areas Near Building 60





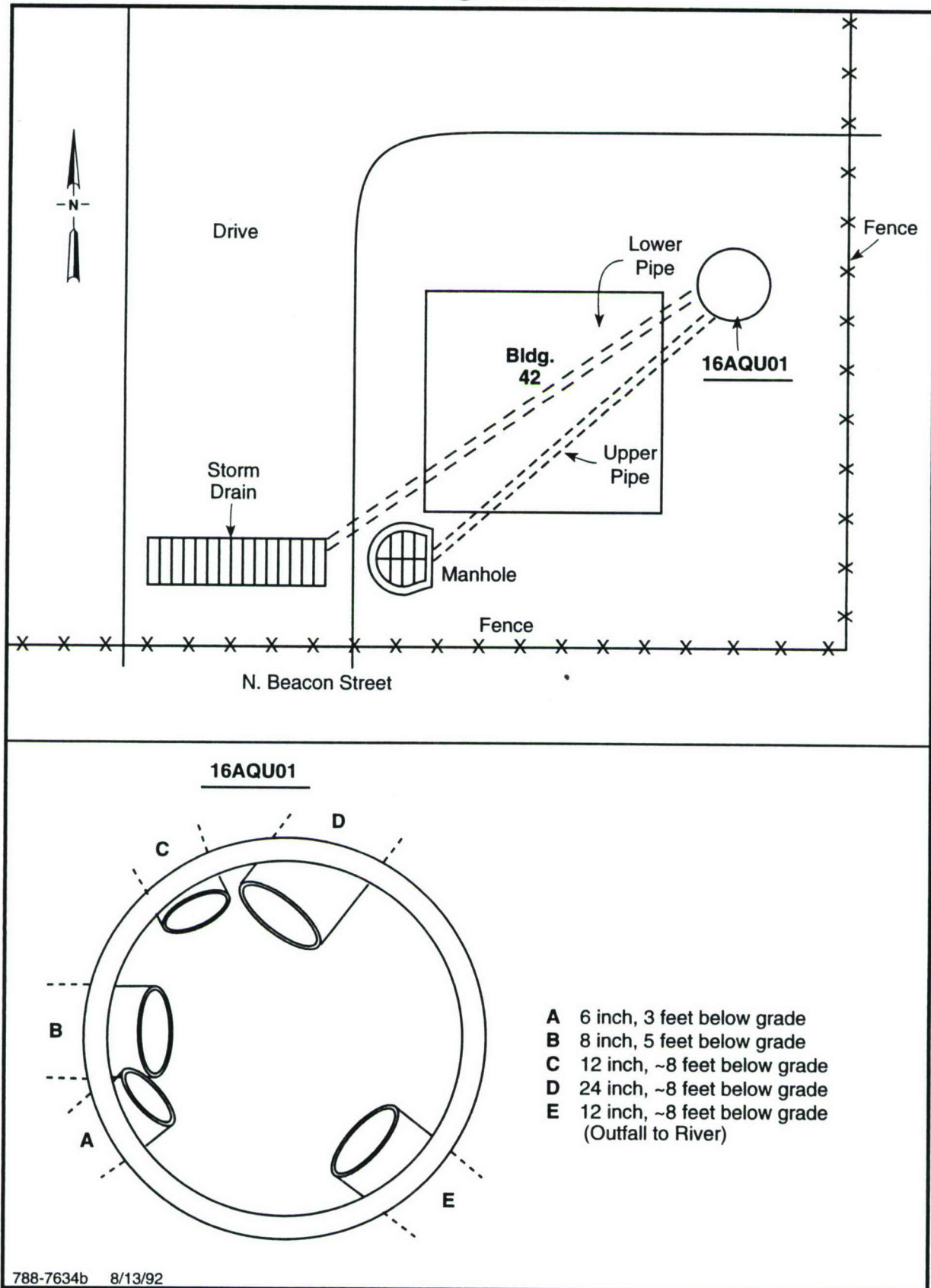
**FIGURE 4-6A GEOPHYSICAL CONFIRMATION OF PIPE CONFIGURATIONS  
AT VARIOUS SEWER JUNCTIONS: 09SLG01**





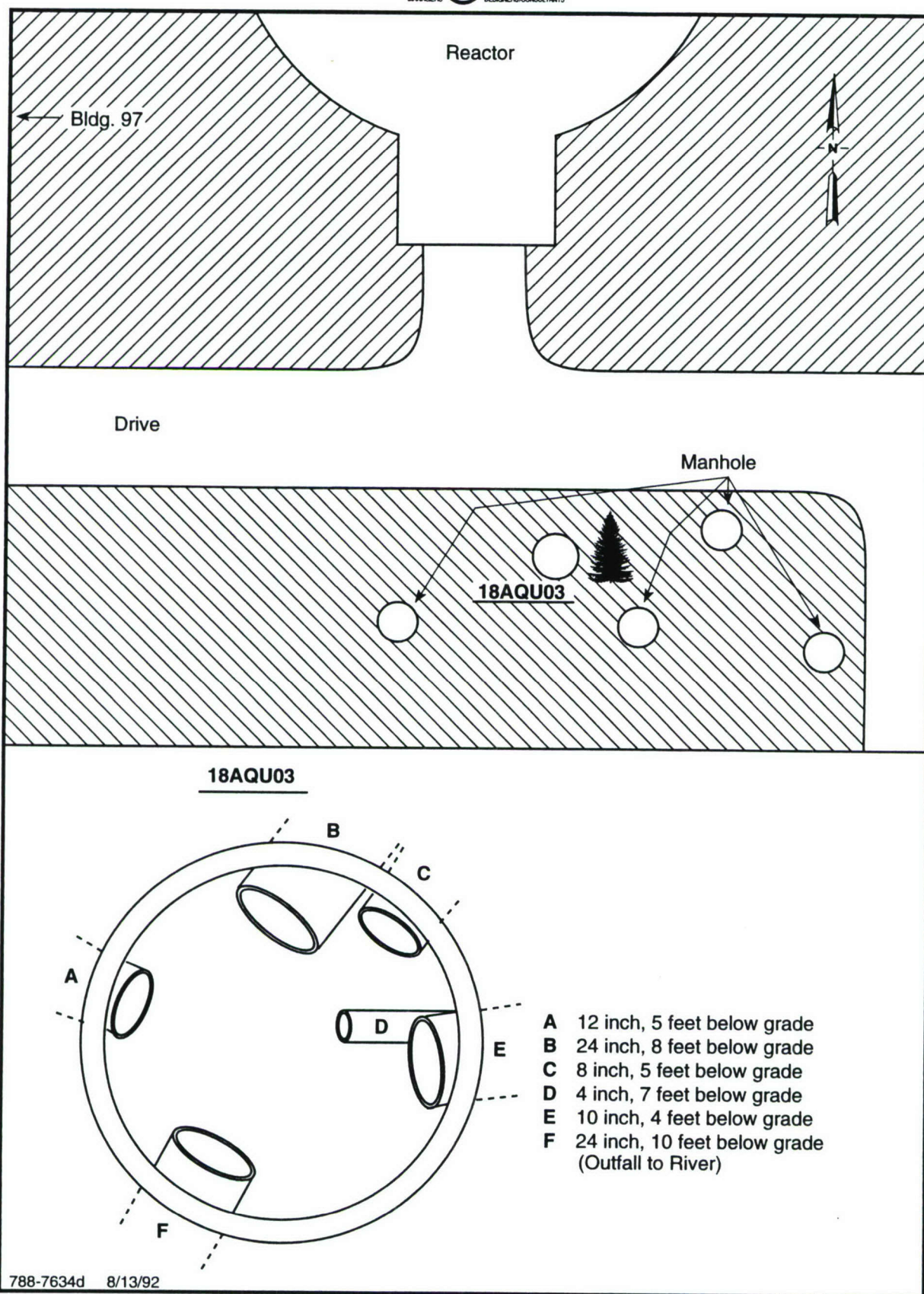
**FIGURE 4-6B GEOPHYSICAL CONFIRMATION OF PIPE CONFIGURATIONS AT VARIOUS SEWER JUNCTIONS: 17AQU01 AND 17AQU02**





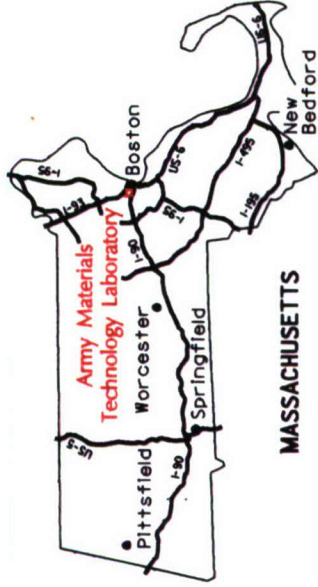
**FIGURE 4-6C GEOPHYSICAL CONFIRMATION OF PIPE CONFIGURATIONS AT VARIOUS SEWER JUNCTIONS: 16AQU01**





**FIGURE 4-6D GEOPHYSICAL CONFIRMATION OF PIPE CONFIGURATIONS AT VARIOUS SEWER JUNCTIONS: 18AQU03**



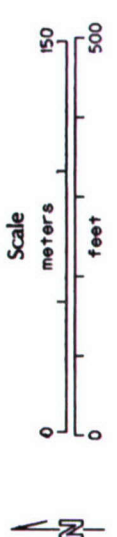


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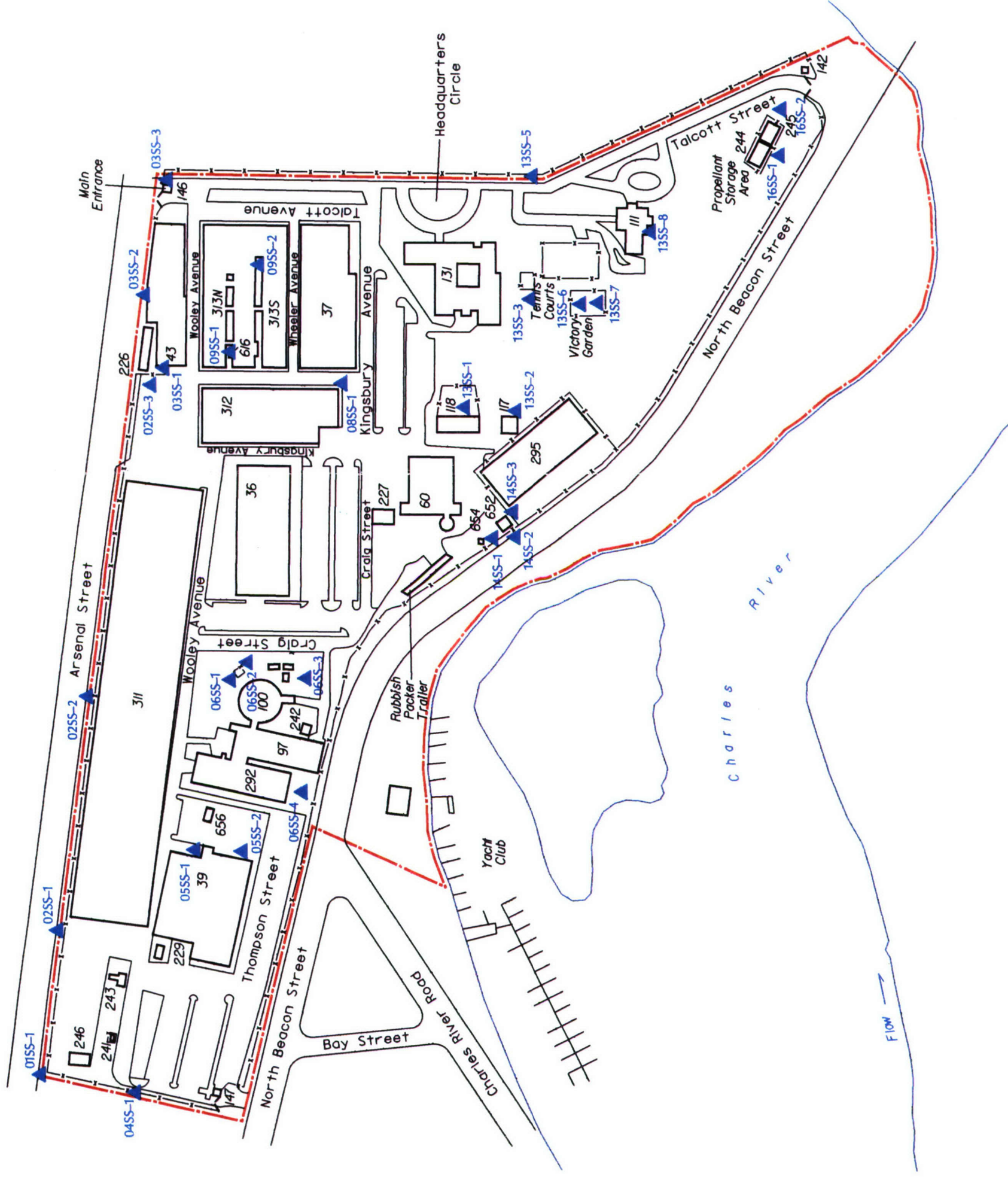
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Figure 4-7  
Phase 2 Surface  
Soil Sampling Locations

▲ Surface Soil Sampling Location



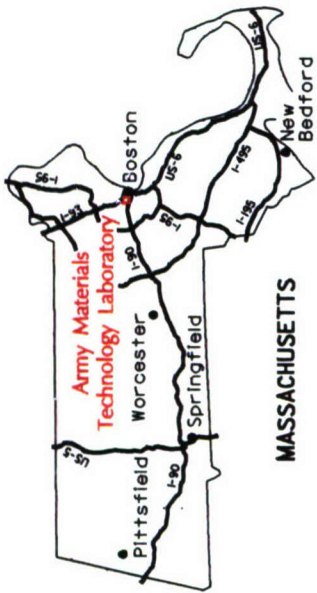
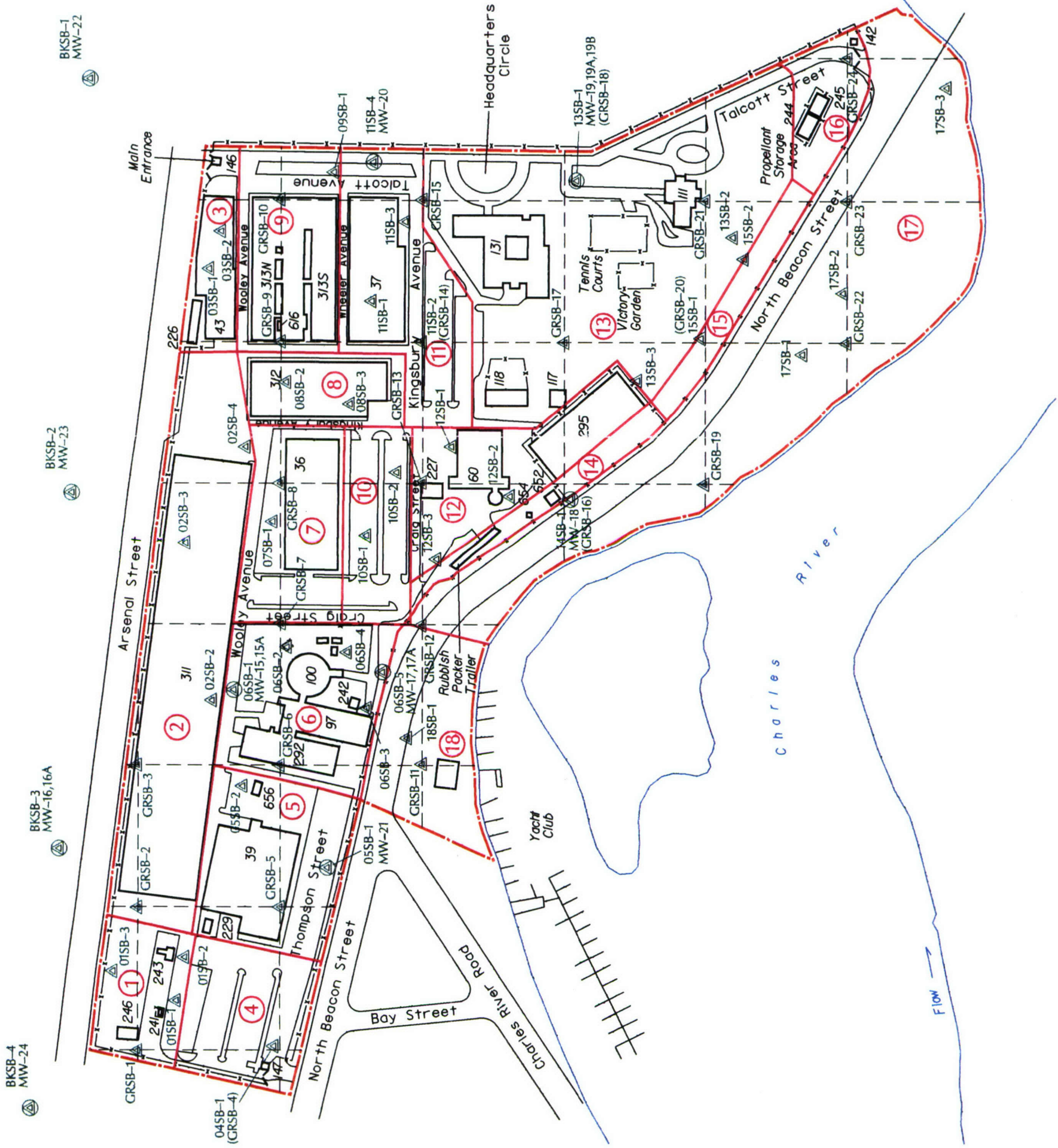
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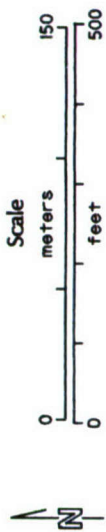




- ▲ Soil Boring Location
- Soil Boring/Monitor Well Location
- ⑬ Sampling Unit Numbers  
(Source: E.G.&G., 1988)
- Sampling Unit Boundary  
(Source: E.G.&G., 1988)
- Soil Sampling Grid

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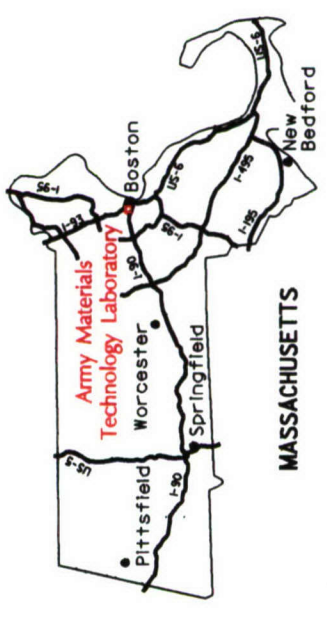
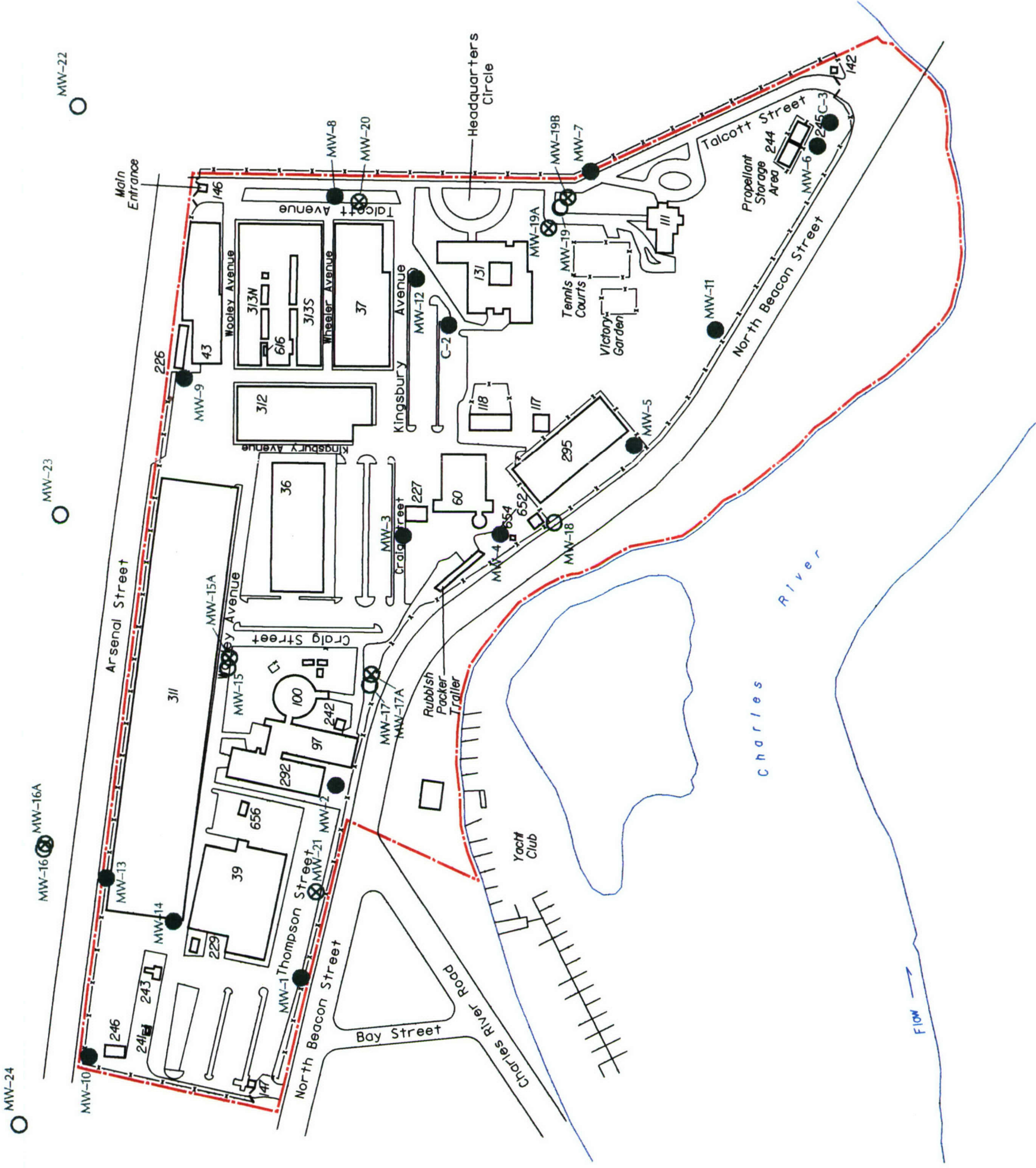
Figure 4-8  
Phase 2 Soil  
Boring Locations



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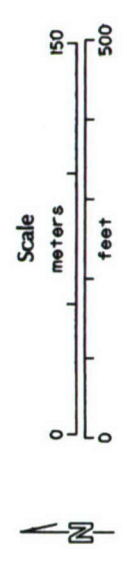




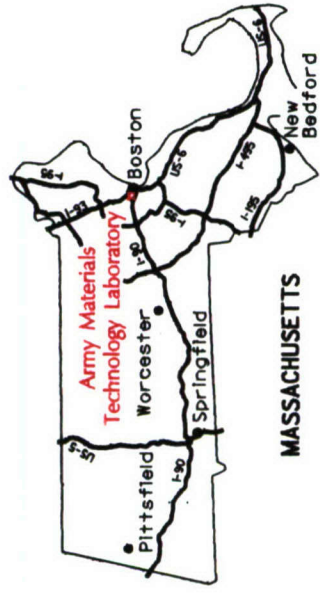
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Figure 4-9  
Phase 2 Monitor  
Well Sampling Locations

- Pre-Existing Monitor Well
- Phase 2 Monitor Well
- ⊗ Phase 2 Deep Monitor Well





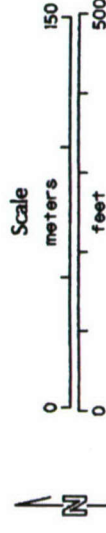


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- SW/SD-14 ● Sediment and Surface Water Sampling Location (with Identification)
- SW/SD-8 ■ Shallow and Deep Sediment Sampling Location (and Surface Water Sampling Location if Identified as such)
- SD-14P (red line) Sediment/Liquid Sample to be Taken from Storm Sewer Outfall Pipe (with Identification)
- SW-10P (red line) Liquid Storm Sewer Sample
- Storm Drain Main
- Drain Manhole
- Catch Basin
- DW Dry Well
- Direction of Flow
- Cistern
- Line Plugged

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Figure 4-10  
Phase 2 River  
And Storm Sewer  
Sampling Locations



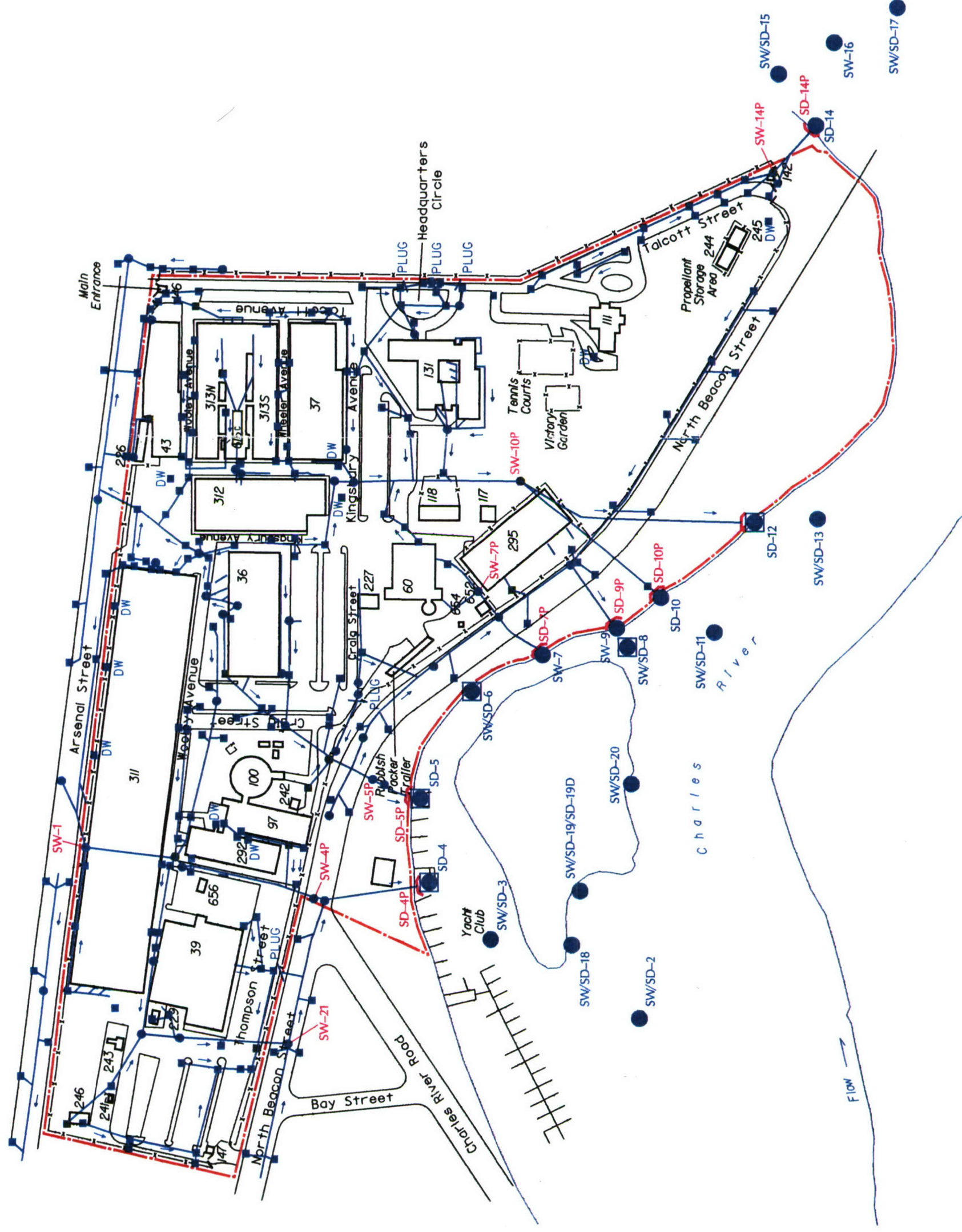
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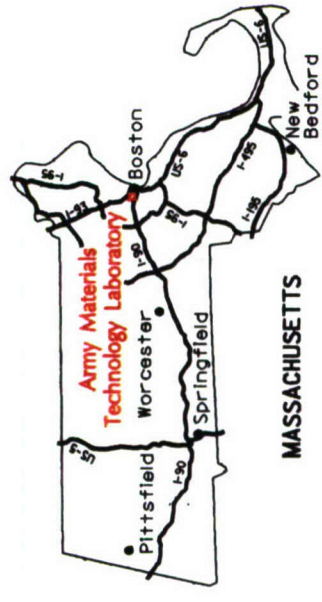
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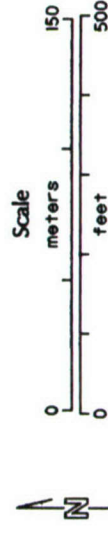


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- Charles River Outfall
- 16AQU01
- Formerly Sampled Location
- Storm Drain Main
- Drain Manhole
- Catch Basin
- DW
- Dry Well
- Direction of Flow
- Cistern
- Line Plugged
- Storm Sewer Line to be Inspected by T.V.

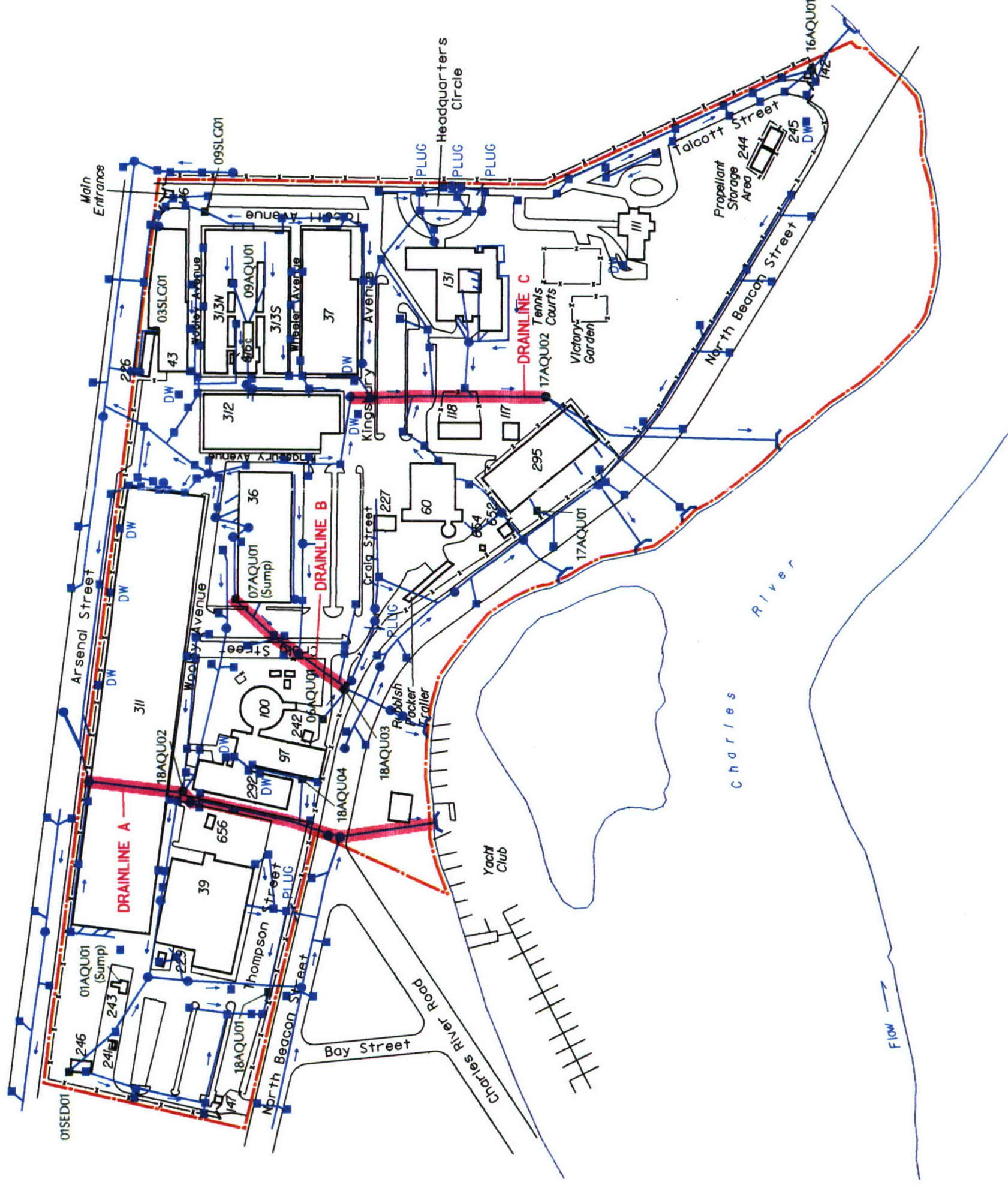
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Figure 4-11  
Areas of Storm  
Sewer Inspection



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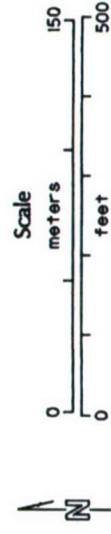


Sanitary Sewer Line  
Manhole (with ID Number)  
Sediment/Liquid Sample  
Taken From Manhole  
Inspected Portion of  
Sanitary Sewer Line

**Figure 4-12  
Phase 2 Sanitary  
Sewer Inspection and  
Sampling Locations**

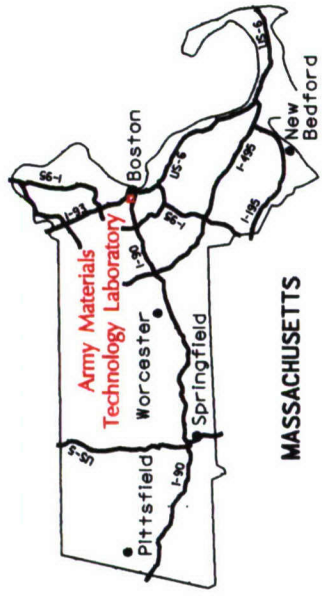
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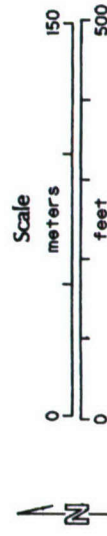


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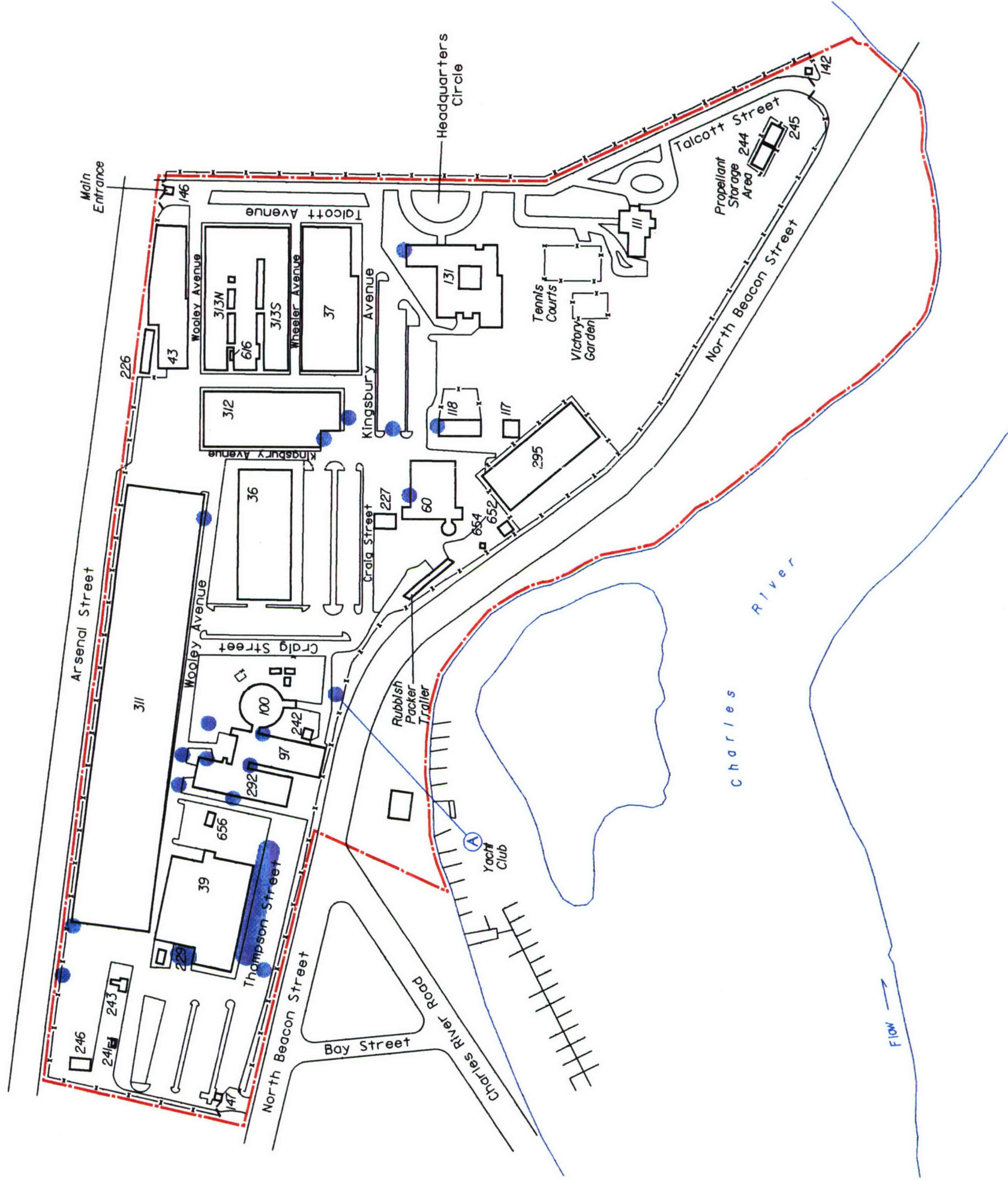
Figure 4-13  
Elevated Outdoor  
Gamma Readings

- Location of Fidler Readings of 9000 cpm or above
- Ⓐ Potential Contamination



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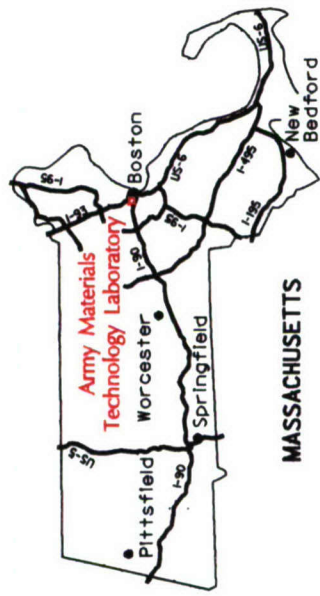
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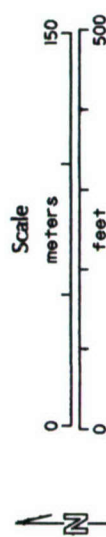


MASSACHUSETTS

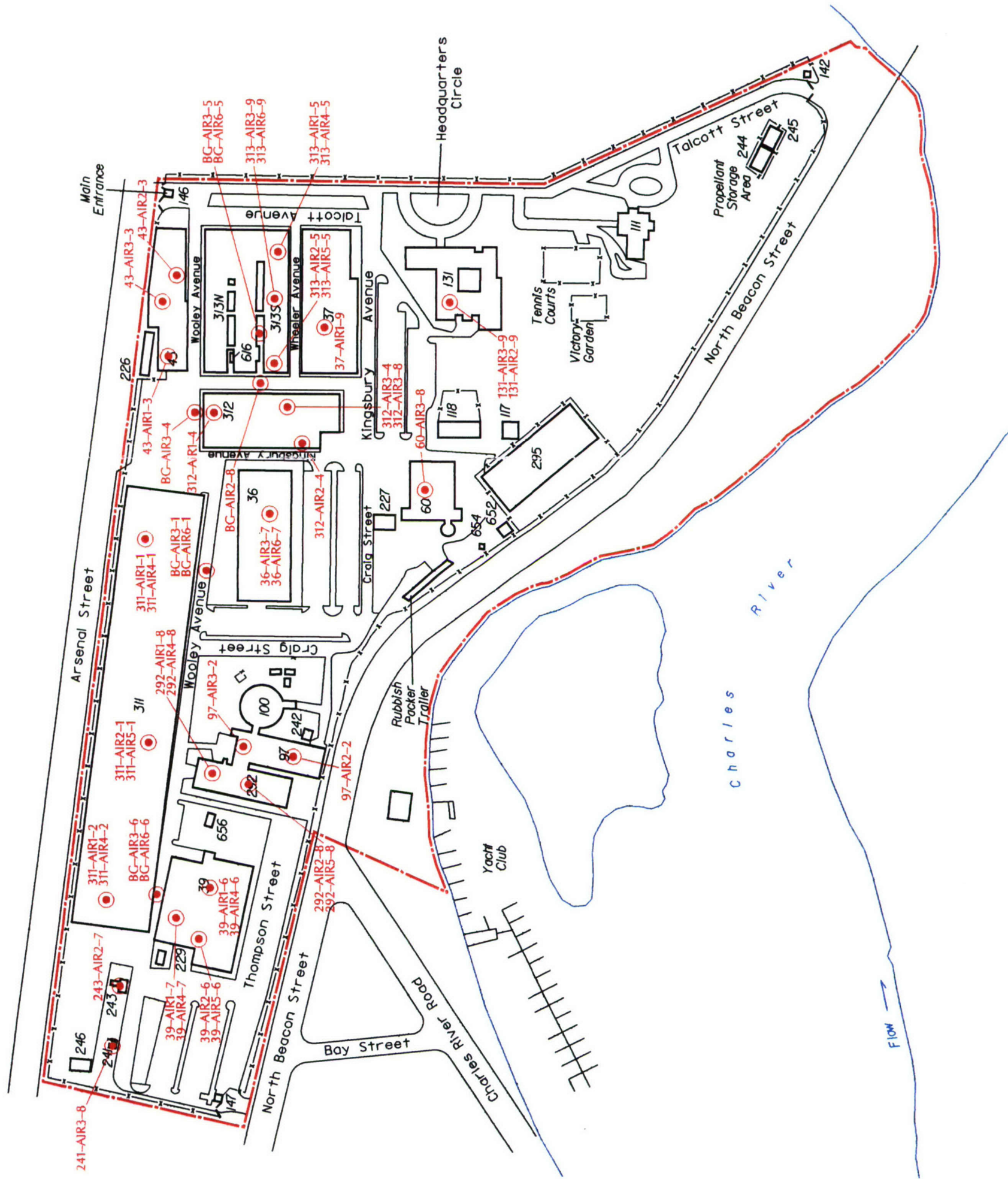
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Figure 4-14  
Phase 2  
Air Samples

312-AIR3-4  
Phase 2 Air Sample



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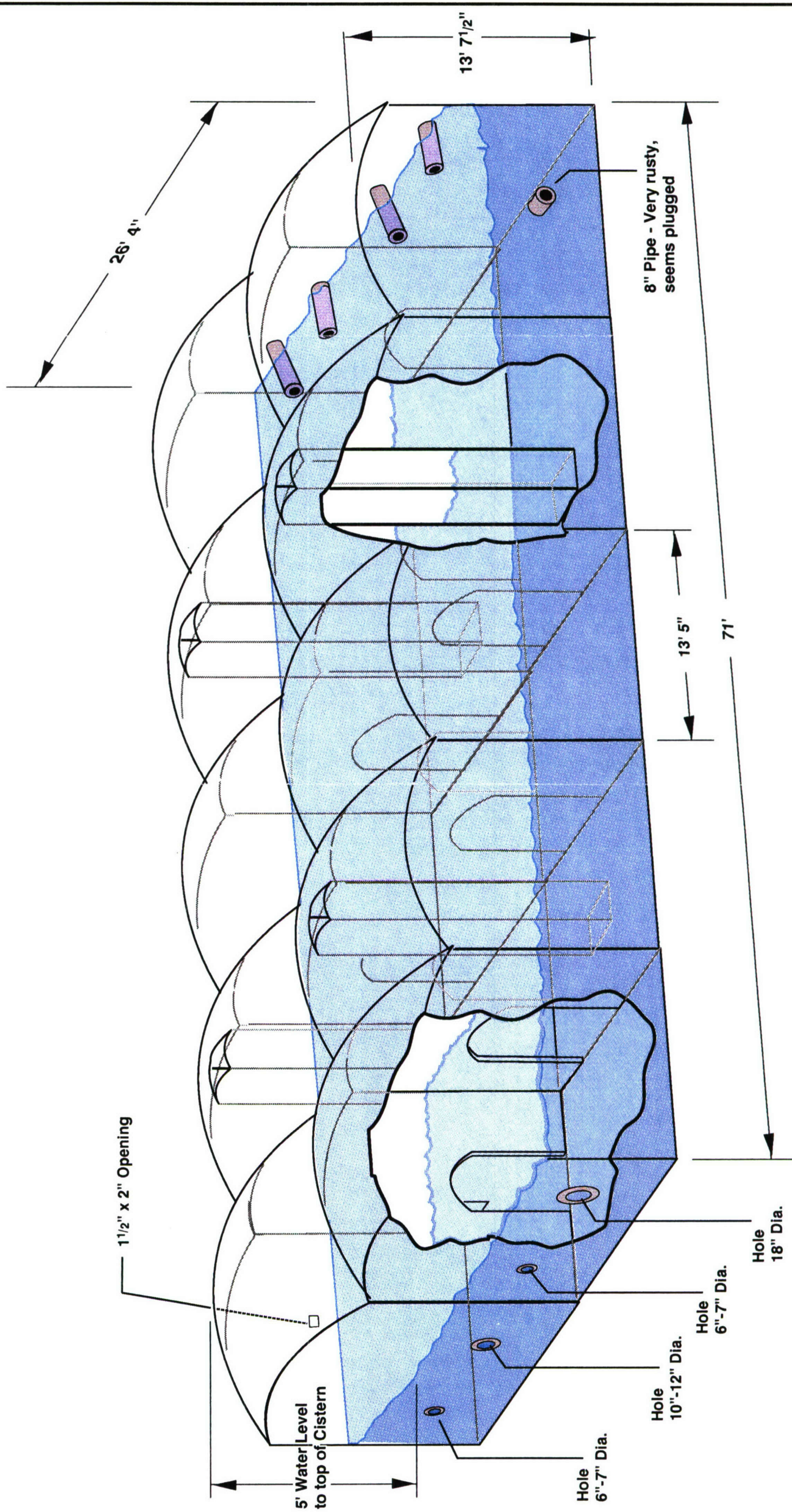
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Note: Three dimensional drawing adapted from a plan view found in Appendix E of the Installation Assessment (THAMA, 1980). As with the source, dimensions and shapes of rooms are approximate. Vertical locations of pipes and depth to water are also approximate.

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**FIGURE 4-16**  
**SCHEMATIC OF BUILDING 313C CISTERN**  
F-37



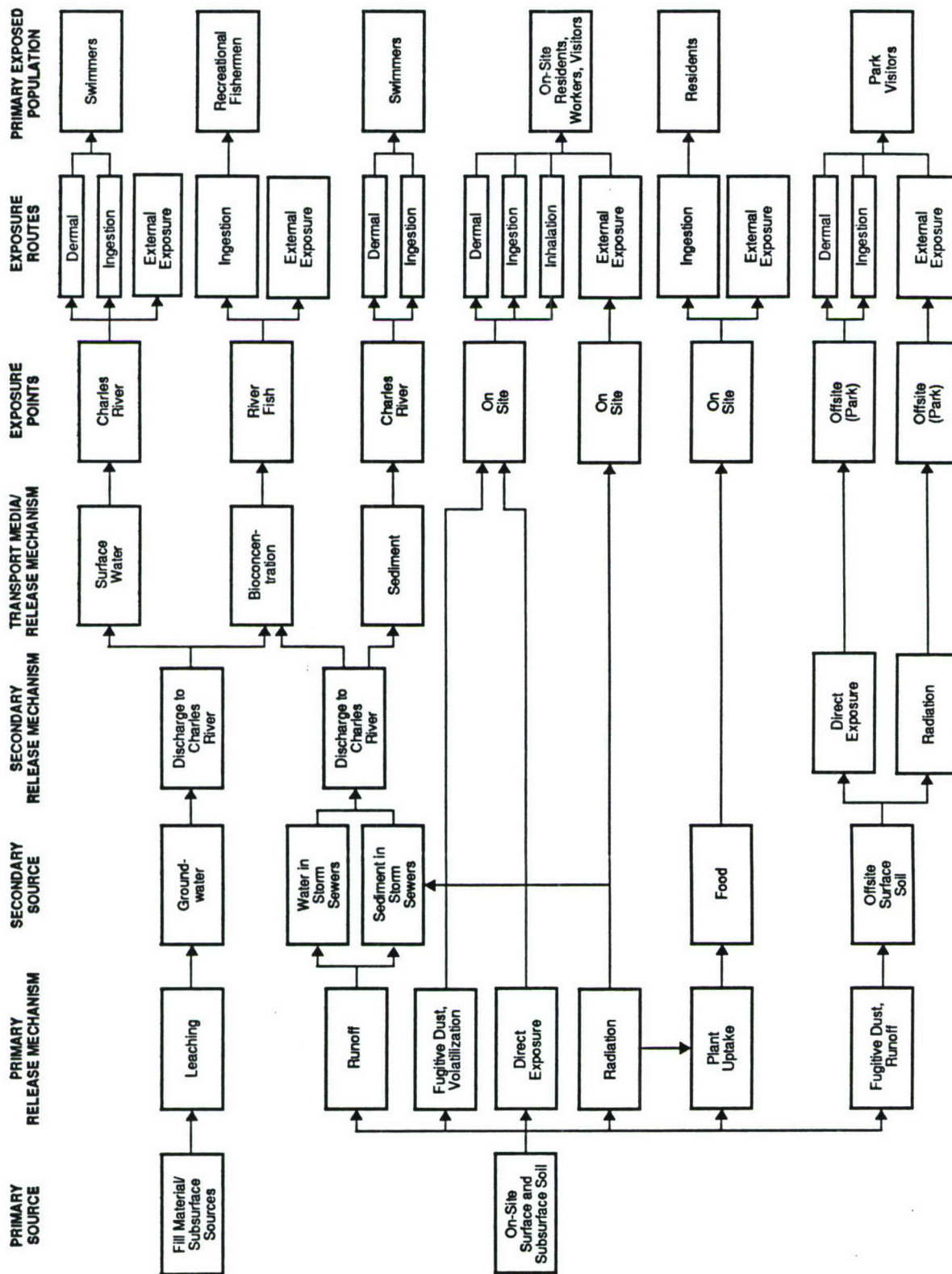
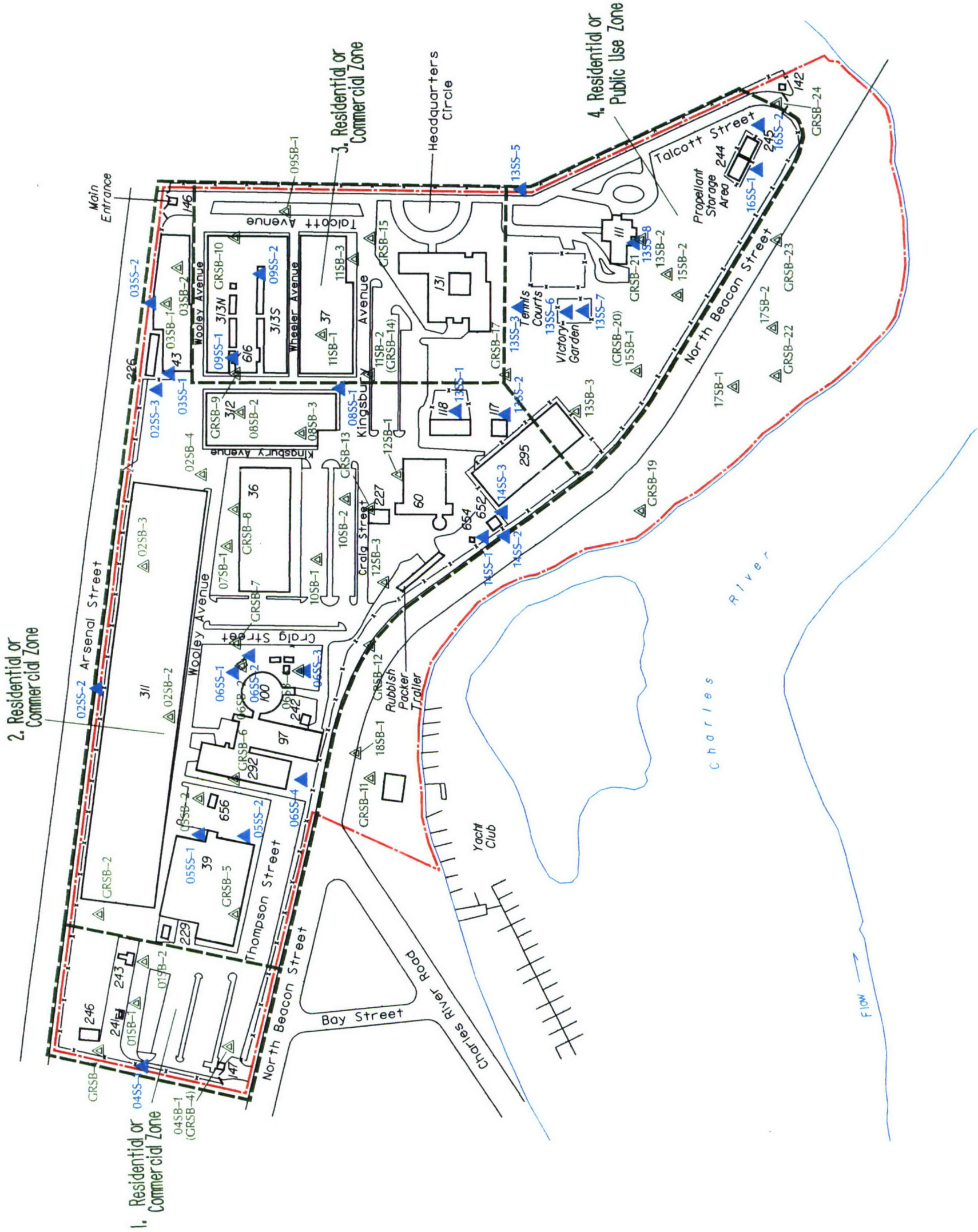
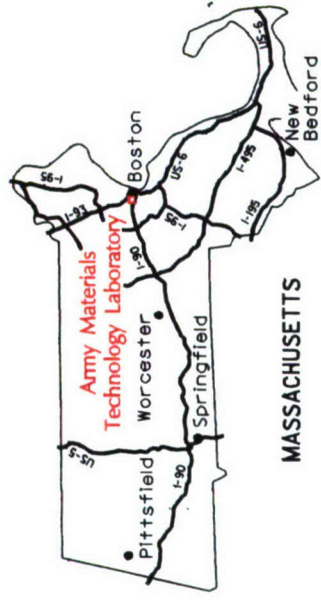


FIGURE 6-1 CONCEPTUAL SITE DIAGRAM FOR MTL BASELINE RISK ASSESSMENT





- Surface Soil Sample Location
- Soil Boring Location

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Figure 6-2  
Likely Future Reuse  
Zones at the MTL Site

Source: Watertown Arsenal Reuse  
Study, May 1993  
Note: Zones 1 and 2 recently changed  
to commercial reuse only  
(Watertown Arsenal Reuse Study,  
November 1993)

